Pacific Marine Science Report 78-19

OCEANOGRAPHIC OBSERVATIONS AT OCEAN STATION P
10 February - 29 March 1978
Volume 89

by

Seakem Oceanography Ltd.

INSTITUTE OF OCEAN SCIENCES, PATRICIA BAY
Sidney, B.C.

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V8L 4B2

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ABSTRACT

Physical, chemical and biological oceanographic observations are made from the weathership at Ocean Weather Station Papa, and between Esquimalt and Station Papa, on a routine continuing basis. Physical oceanography data only are shown, including surface observations and profiles obtained with bottle casts and conductivity-temperature-pressure instruments.

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INTRODUCTION

Canadian operation of Ocean Weather Station P (Latitude 50°00' N, Longitude 145°00' W) was inaugurated in December, 1950. The station is occupied primarily to make meteorological observations of the surface and upper air and to provide an air-sea rescue service. The station is manned by two vessels operated by the Marine Services Branch of the Ministry of Transport. They are the CCGS Vancouver and the CCGS Quadra. Each ship remains on station for a period of six weeks, and is then relieved by the alternate ship, thus maintaining a continuous watch.

Bathythermograph observations have been made at Station P since July 1952. A program of more extensive oceanographic observations commenced in August 1956. This was extended in April 1959, by the addition of a series of oceanographic stations along the route to and from Station P and Swiftsure Bank. These stations are known as Line P stations. The number of stations on Line P has been increased twice and now consists of twelve stations (Fig. 1). Bathythermograph observations and surface salinity sample collections, in addition to being made on Line P oceanographic stations, are also made at odd meridians at 40', i.e. 139°40'W, 141°40'W, etc. These stations are known as Line P BT stations. Data observed prior to 1968 have been indexed by Collins et al. (1969).

The present record includes hydrographic, continuously sampled STP and surface salinity and temperature data collected from the CCGS Vancouver during the period 10 February to 29 March 1978.

All physical oceanographic data have been stored by the Canadian Oceanographic Data Centre (CODC), 615 Booth Street, Ottawa, Ontario, Canada. Requests for these data should be directed to CODC.

Biological and productivity data are published in the Manuscript Report series of the Fisheries Research Board of Canada (FRB), Pacific Biological Station, Nanaimo, British Columbia, Canada. Requests for these data should be directed to FRB.

Marine geochemical data are for the Ocean Chemistry Group, Ocean and Aquatic Sciences, Environment Canada, Institute of Ocean Sciences, P.O. Box 6000, Sidney, British Columbia, Canada, V8L 4B2.

PROGRAM OF OBSERVATION FROM CCGS VANCOUVER, 10 FEBRUARY - 29 MARCH 1978 (P-78-2) (CODC Ref. No. 15-78-002)

Oceanographic observations were made by Mr. B. Whitehouse of Seakem Oceanography Ltd., Sidney, B.C.

En Route to Station P

Line P Stations 5, 10 and 12 were occupied and an STP profile made to near bottom or 1500 metres. One hydrocast was made at Station 10 to 1500 metres. Stations 1 to 4 were cancelled by the bridge due to a delayed departure from Esquimalt, B.C.

Samples for salinity, nitrates, nutrients, alkalinity and total CO_2 were collected at Stations 10 and 12 from the seawater loop. Bucket salinity, nutrient and nitrate samples were collected at Station 5. Surface bucket temperatures were taken at Stations 5, 10 and 12. The samples usually taken at other stations were missed due to a malfunction in the seawater loop.

A surface tarball tow was made at Station 10.

The surface temperature recorder and PCO_2 system were run continuously. The thermosalinograph ran from Esquimalt harbour to Station J-2-A and from Station 12 to P.

Mechanical BT's were taken at Stations 5, 10 and 12. XBT's were taken at Stations 2 to 4, 5½ to 9½, 10½ to 11 and 12½. Station 1 was missed due to an equipment malfunction and Station 11½ was missed due to rough weather.

On Station P

The oceanographic program was carried out as follows:

Physical Oceanography:

1) Profiles for salinity, temperature and oxygen were obtained from 5 hydrocasts to 4200 metres.

2) Thirty-four STP profiles to 1500 metres were obtained.

3) BT's were taken every 3 hours to coincide with meteorological observations and encoded and transmitted according to the IGOSS format. XBT's were taken during rough weather.

4) Salinity samples were collected daily at 0000 hrs GMT from either the seawater loop or a bucket.

5) Twenty-one extra STP profiles were obtained to 300 metres from triangle grids set up by Cruise 15-77-006 as part of the MILE program.

Marine Geochemistry:

1) Nutrient and salinity samples were collected daily at 0000 hrs GMT from either a bucket or the seawater loop. A 24-hour series for nutrients was also completed, with a sample taken every hour. Two profiles for nutrients and one profile for tritium to 500 metres were taken. One bucket sample and one rainwater sample for tritium and 4 rainwater samples for Pb^{210} were collected.

2) Alkalinity and total CO_2 samples were collected about every three days from a bucket or the seawater loop. One profile to 500 metres was taken.

3) Air CO_2 samples were collected in quadruplicate on Sundays. Extra samples were collected on Thursdays.

4) Six surface tarball tows were completed.

5) PCO_2 carboys were filled in duplicate every week.

6) One sample each of seawater C-14, seawater C-13 and air C-13 was collected.

Biological Oceanography:

1) Five 150 metre vertical plankton hauls.
Two 1200 metre vertical plankton hauls.
Two groups of subsurface plankton hauls were taken on 3 consecutive nights at sunset. Another group of hauls was started, but cancelled due to rough weather.

2) Five Secchi disc readings taken at local noon.

3) Two profiles to 200 metres for each of plant pigment and nitrate were obtained, as well as 4 surface samples each.

4) Two profiles to 500 metres for chlorophyll a were obtained.

En Route from Station P

Line P Stations 12 to 1 were occupied and an STP profile made to 1500 metres or to near bottom. A hydrocast to 1500 metres was completed at Station 6.

Samples for nutrients, nitrates, alkalinity, salinity and total CO_2 were collected at Stations 12 to 1 from the seawater loop. Surface bucket temperatures were taken at Stations 12 to 1.

Surface tarball tows were made at Stations 12, 10, 8, 6, 4 and 2.

The surface temperature recorder and PCO_2 system were run continuously. The thermosalinograph was not run since the seawater loop was malfunctioning.

Mechanical BT's or XBT's were taken at Stations 12½ to 1.

Observations for Other Agencies

1) Marine mammal observations were made by the ship's officers for Mr. I. McAskie, Fisheries Research Board of Canada, Pacific Biological Station, Nanaimo, British Columbia, Canada.

2) Bird observations were made by the ship's officers for Dr. M. Myres, University of Alberta, Calgary, Alberta, Canada and Mr. J. Guiguet, Curator of Birds and Mammals, Provincial Museum, Department of Provincial Secretary and Travel Industry, Victoria, British Columbia, Canada.

3) Air CO_2 samples were taken weekly in duplicate for Scripps Institute of Oceanography, La Jolla, California, U.S.A.

Data were processed for publication by Ms. M. Sainsbury of Seakem Oceanography Ltd., Sidney, B.C.

OBSERVATIONAL PROCEDURES

Observations for salinity, oxygen and temperature from all hydrographic casts, including the surface, were obtained with Niskin water sample bottles equipped with either Richter and Wiese and/or Yoshino Keiki Co. reversing thermometers. Two protected thermometers were used on all bottles and one unprotected thermometer was used on each bottle at depths of 300 metres or greater. The accuracy of protected reversing thermometers is believed to be $\pm 0.02^{\circ}C$.

The daily surface water temperatures were measured from a bucket sample using a deck thermometer of $\pm 0.1^{\circ}C$ accuracy. The daily surface salinity samples were obtained from the seawater loop. When the seawater loop was not operational these samples were obtained with a bucket, and are indicated with a 'b' in this data record.

Salinity determinations were made aboard ship with either an Autolab Model 601 Mark III inductive salinometer or a Hytech Model 6220 lab salinometer. Accuracy using duplicate determinations is estimated to be ± 0.003 $^{o}/oo$.

Depth determinations were made using the "depth difference" method described in the U.S.N. Hydrographic Office Publication No. 607 (1955). Depth estimates have an approximate accuracy of ±5 metres for depths less than 1000 metres, and ±0.5% of depth for depths greater than 1000 metres.

The dissolved oxygen analyses were done in shipboard laboratory by a modified Winkler method (Carpenter, 1955).

Line P engine intake continuous temperature on both ships was recorded by a Honeywell Electronik 15 Recorder. The temperature probe is at a depth of approximately 3 metres below the sea surface and the instrument accuracy is believed to be $\pm 0.1^{\circ}C$.

Each ship is equipped with a Plessey Model 6600-T thermosalinograph which is used, on Line P, for continuous recording of surface temperatures and salinities from the ship's seawater loop. The temperature probe is mounted at the seawater loop intake (approximately 3 metres below the surface) and the salinity probe and recorder are situated in the dry lab. The accuracy of this instrument is believed to be ±0.1^{o}C for temperature and ±0.1 ^{o}/oo for salinity.

STP profiles were taken with a Guildline Model 8700 STP system.

COMPUTATIONS

All hydrographic data were processed with the aid of an IBM 370 computer and a UNIVAC 1100 computer. Reversing thermometer temperature corrections, thermometric depth calculations and accepted depth from the "depth difference" method were computed. Extraneous thermometric depths caused by thermometer malfunctions were automatically edited and replaced. A Calcomp 565 Offline Plotter was used to plot temperature-salinity and temperature-oxygen diagrams, as well as plots of temperature, salinity and dissolved oxygen vs $\log_{10}$ depth. These plots were used to check the data for errors.

Missing hydrographic data were obtained using a weighted parabolas interpolation method (Reiniger and Ross, 1968). These data are indicated with an asterisk in this data record.

Data values which we suspect but which we have included in this data record are indicated with a plus. These data have been removed from punch card and magnetic tape records.

Analog records from the salinity-temperature-pressure instrument have been machine digitized, then replotted using the Calcomp plotter.

Digitization was continued until original and computer plotted traces were coincident. Temperature and salinity values were listed at standard pressure; integrals (depths, geopotential anomaly, and potential energy anomaly) were computed from the entire array of digitized data.

The headings for the data listings are explained as follows:

PRESS	is pressure (decibars)
TEMP	is temperature (degrees Celsius)
SAL	is salinity (parts per thousand)
DEPTH	is reported in metres
SIGMA-T	is specific gravity anomaly
SVA	is specific volume anomaly
THETA	is potential temperature (degrees Celsius)
SVA (THETA)	is potential specific volume anomaly
DELTA D	is geopotential anomaly (J/kg)
POT EN	is potential energy in units of 10^8 ergs/cm^2
OXY	is the concentration of dissolved oxygen expressed in millilitres per litre
SOUND	is the velocity of sound in m/sec

REFERENCES

Carpenter, J.H., 1965. The Chesapeake Bay Institute technique for the Winkler dissolved oxygen method. Limnol. and Oceanogr, 10, 141-143.

Collins, C.A., R.L. Tripe, D.A. Healey and J. Joergensen, 1969. The time distribution of serial oceanographic data from the Ocean Station P programme. Fish. Res. Bd. Can. Tech. Rept. No. 106.

MacNeill, M., 1977. A study of anomalous salinity and oxygen values in the deep water at Ocean Station P from 1960-1976 (unpublished manuscript). Pacific Marine Science Report 77-9.

Reiniger, R.F. and C.K. Ross, 1968. A method of interpolation with application to oceanographic data. Deep Sea Res. 15, 185-193.

U.S.N. Hydrographic Office, 1955. Instruction Manual for oceanographic observations. Publ. No. 607.

LOG OF HYDROGRAPHIC AND STP OBSERVATIONS

Consec #	Positions	Date (Z)	Time (Z)	STP (m)	Hydrocasts (m)	Comments
1	128-40°W	11/02/78	1350	1,425		
2	138-40°W	12/02/78	1910	1,425		
3	138-40°W	12/02/78	2003		1,500	T, S
4	142-40°W	13/02/78	0950	1,100		
5	P	13/02/78	2105	1,300		
6	P	15/02/78	1945	1,250		
7	P	16/02/78	2115	1,320		
8	P	17/02/78	1736	1,290		
9	P	19/02/78	1715	1,320		
10	P	20/02/78	1710	1,215		
11	P	22/02/78	1745	1,370		
12	P	23/02/78	1715	1,250		
13	P	23-24/02/78	1800		4,200	T, S, O_2
14	P	24/02/78	1712	1,275		
15	P	25/02/78	1710	1,425		
16	P	25/02/78	1750		500	T, S, O_2
17	P	26/02/78	1712	1,150		
18	P	27/02/78	1710	1,425		
19	P	27/02/78	1751		200	Biological Cast
20	P	28/02/78	1709	1,425		
21	P	01/03/78	1710	1,405		
22	P	01/03/78	1750		4,200	T, S, O_2
23	P	02/03/78	1714	1,405		
24	P	02/03/78	1800		3,000	T, S, O_2
25	P	03/03/78	1710	1,425		
26	P	04/03/78	1712	1,425		
27	P	05/03/78	1710	1,270		
28	P	06/03/78	1720	300		
29	P	07/03/78	1710	1,370		
30	P	08/03/78	1710	1,330		
31	P	09/03/78	1710	1,425		
32	P	09/03/78	1750		4,200	T, S, O_2
33	P	10/03/78	1717	1,405		
34	P	11/03/78	1712	1,350		
35	P	12/03/78	1735	1,385		
36	P	13/03/78	1710	1,410		
37	P	14/03/78	1740	300		
38	P	15/03/78	1707	1,360		
39	P	15/03/78	1745		4,200	T, S, O_2
40	P	16/03/78	1711	1,425		
41	P	16/03/78	1755		500	T, S
42	P	17/03/78	1715	1,425		
43	P	18/03/78	1710	1,425		
44	P	23/03/78	1730		4,200	T, S, O_2
45	P	23/03/78	2340	1,425		
46	P	24/03/78	1710	1,425		
47	P	25/03/78	1714	1,425		

LOG OF HYDROGRAPHIC AND STP OBSERVATIONS (Continued)

Consec #	Positions	Date (Z)	Time (Z)	STP (m)	Hydrocasts (m)	Comments
48	P	25/03/78	1755		200	Biological Cast
49	142-40°W	26/03/78	1824	1,295		
50	140-40°W	27/03/78	0120	1,425		
51	138-40°W	27/03/78	0805	1,360		
52	136-40°W	27/03/78	1554	1,420		
53	134-40°W	27/03/78	2305	1,425		
54	132-40°W	28/03/78	0620	1,425		
55	130-40°W	28/03/78	1345	1,425		
56	130-40°W	28/03/78	1425		1,500	T, S
57	128-40°W	28/03/78	2230	1,425		
58	127-40°W	29/03/78	0230	1,405		
59	126-40°W	29/03/78	0626	1,200		
60	126-00°W	29/03/78	0941	80		
61	125-33°W	29/03/78	1145	80		

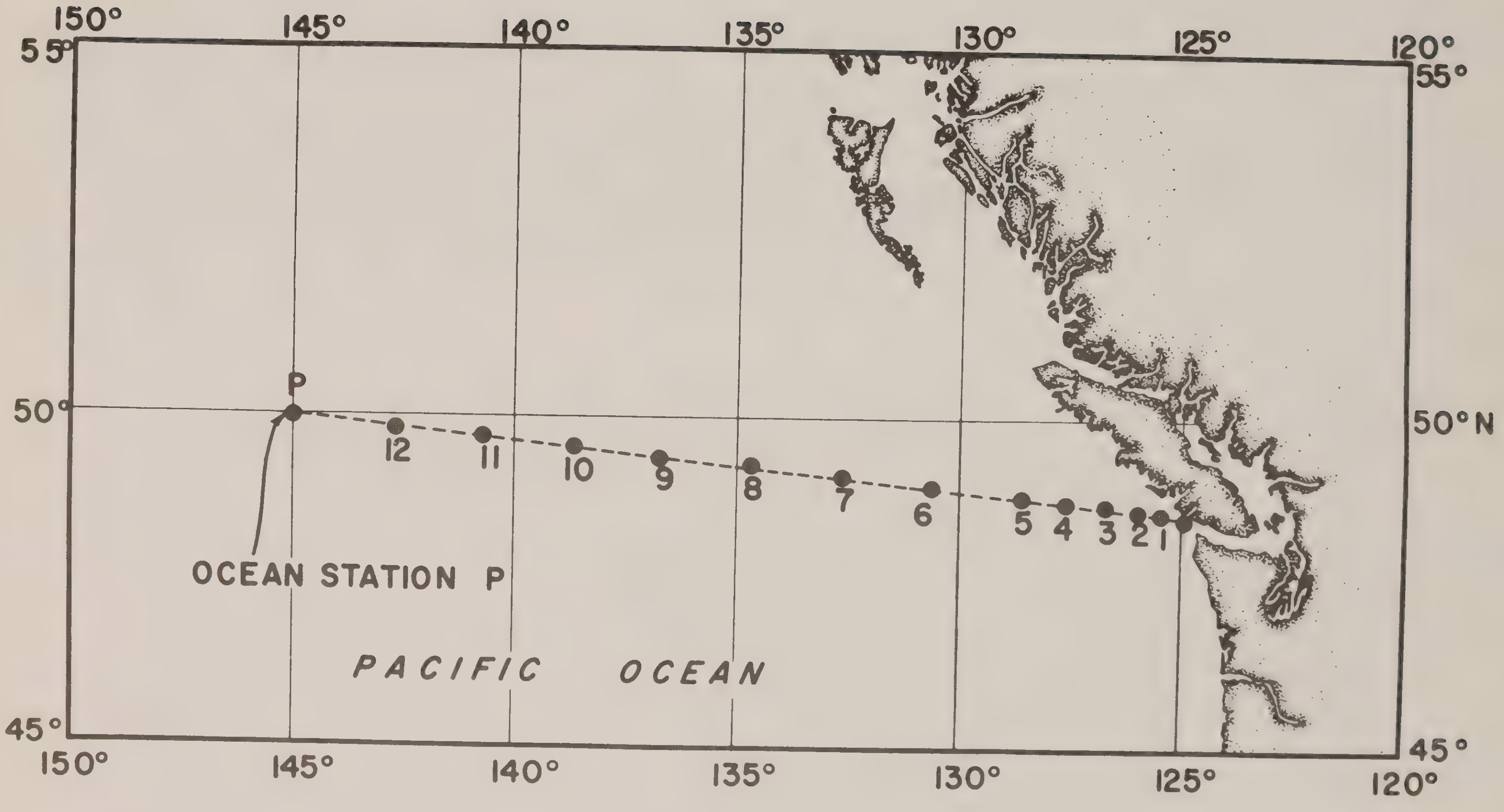


Fig. 1 Chart showing Line P station positions.

Oceanographic Data Obtained on Cruise P-78-2

(CODC Reference No. 15-78-002)

Results of Hydrographic Observations

(P-78-2)

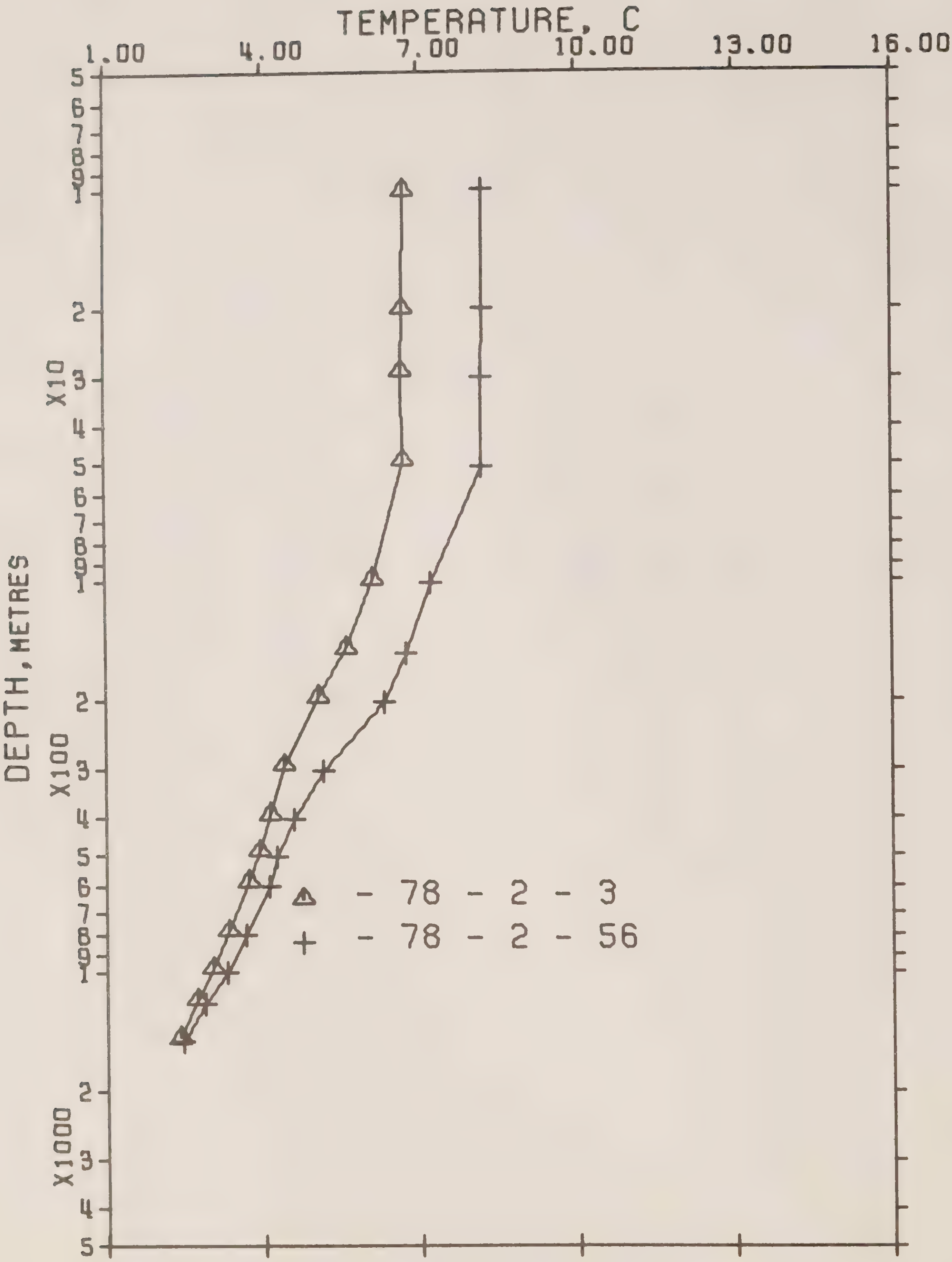


Figure 2. Composite plot of temperature vs $\log_{10}$ depth for Line P Stations.

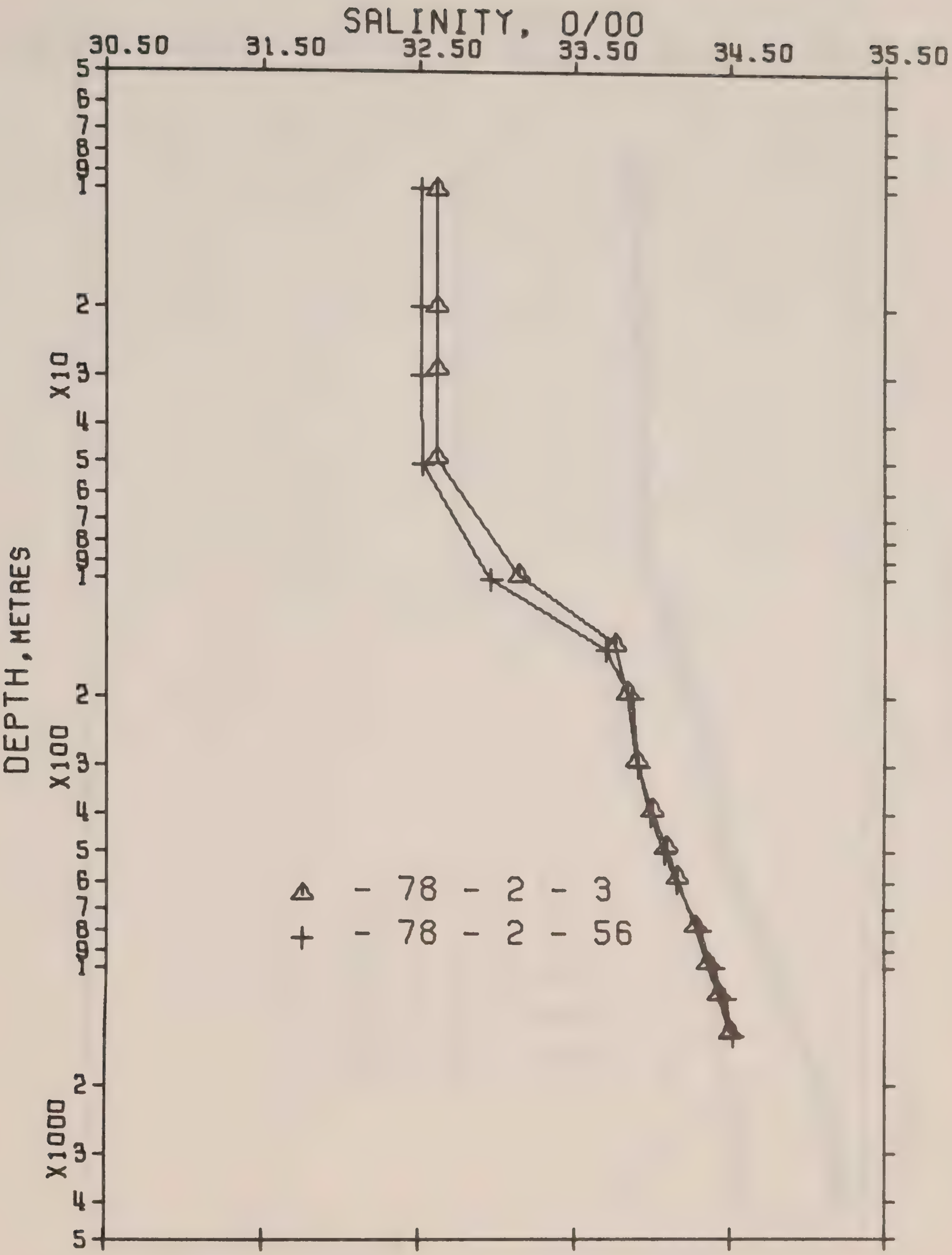


Figure 3. Composite plot of salinity vs $\log_{10}$ depth for Line P Stations.

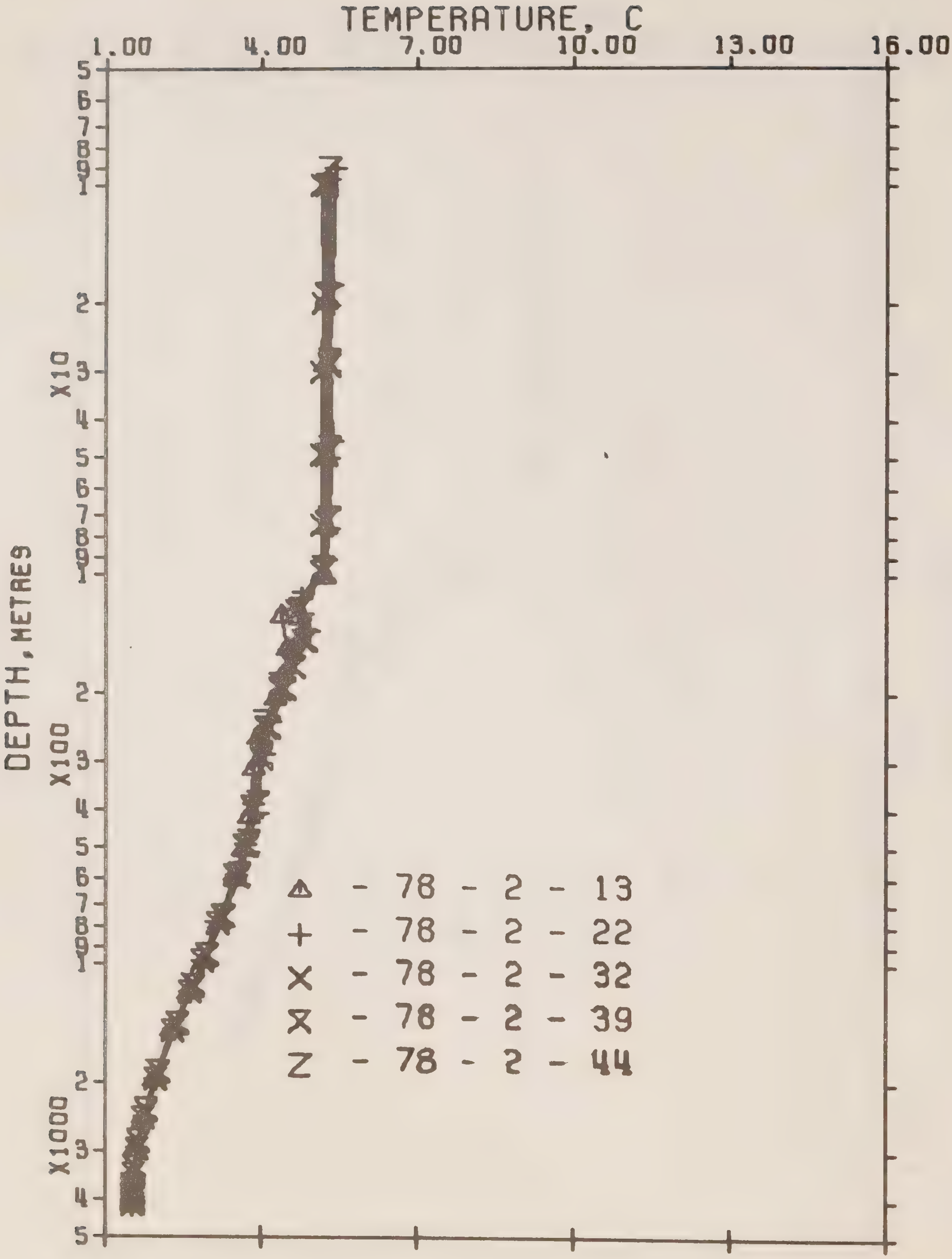


Figure 4. Composite plot of temperature vs $\log_{10}$ depth for Station P.

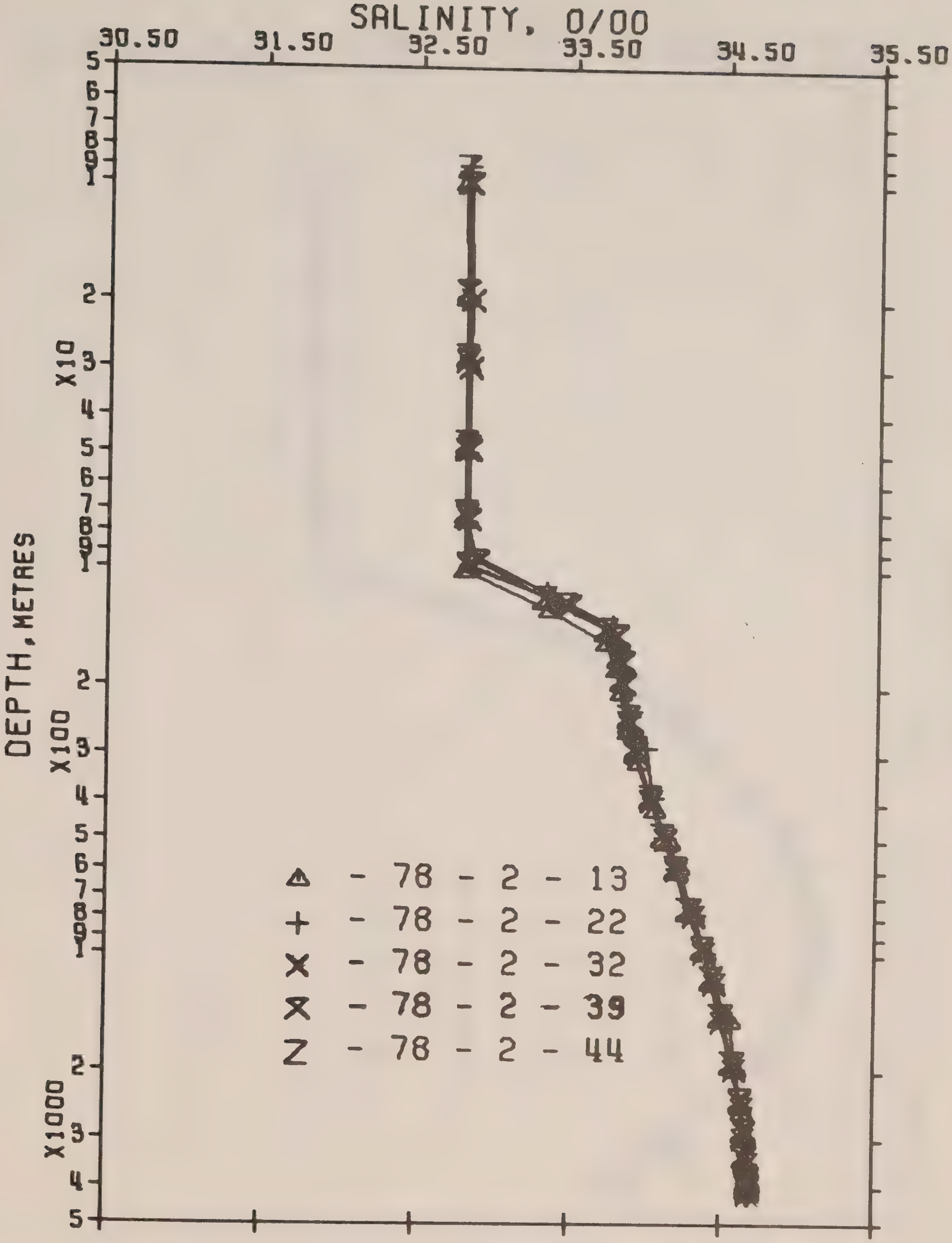


Figure 5. Composite plot of salinity vs $\log_{10}$ depth for Station P.

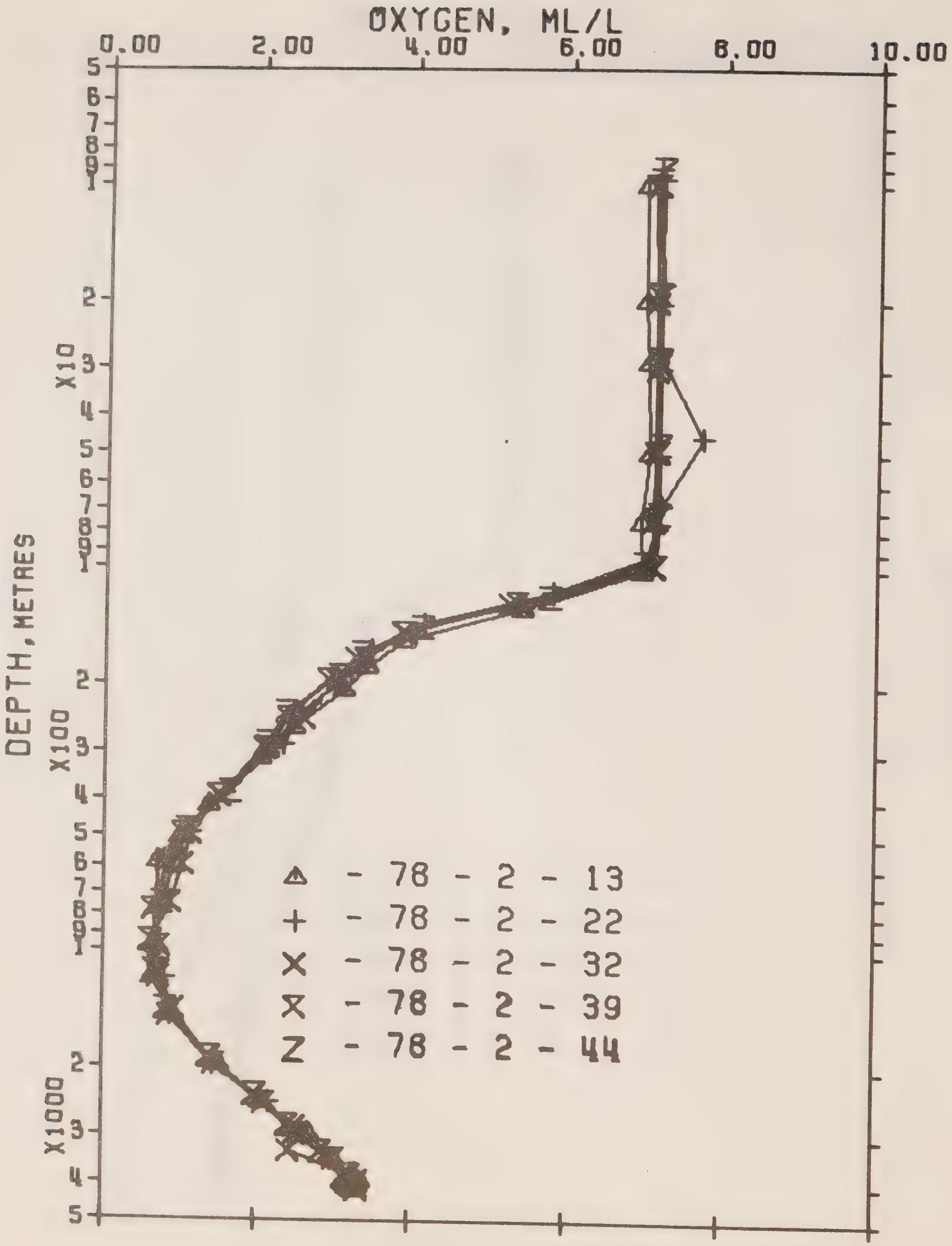
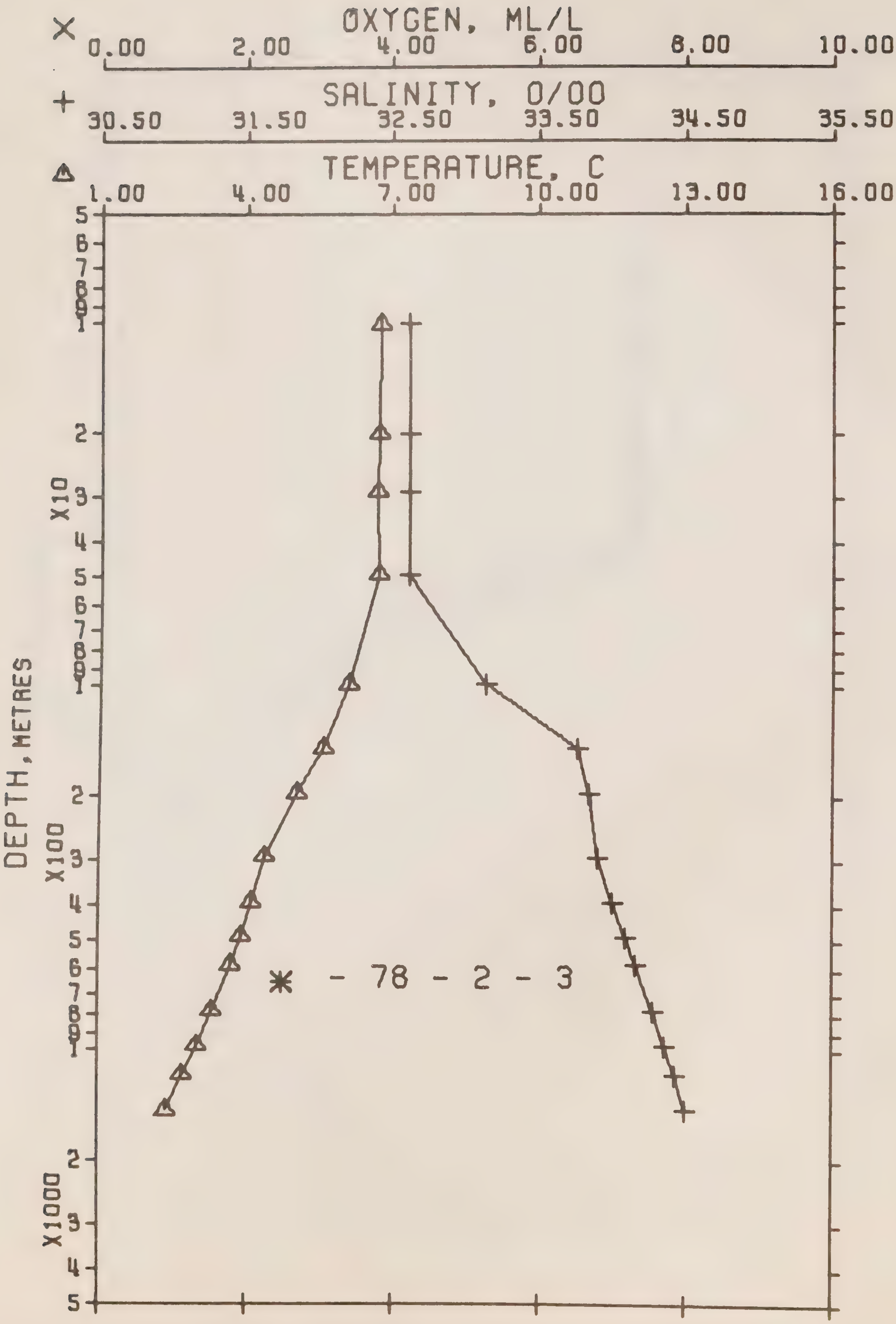


Figure 6. Composite plot of oxygen vs $\log_{10}$ depth for Station P.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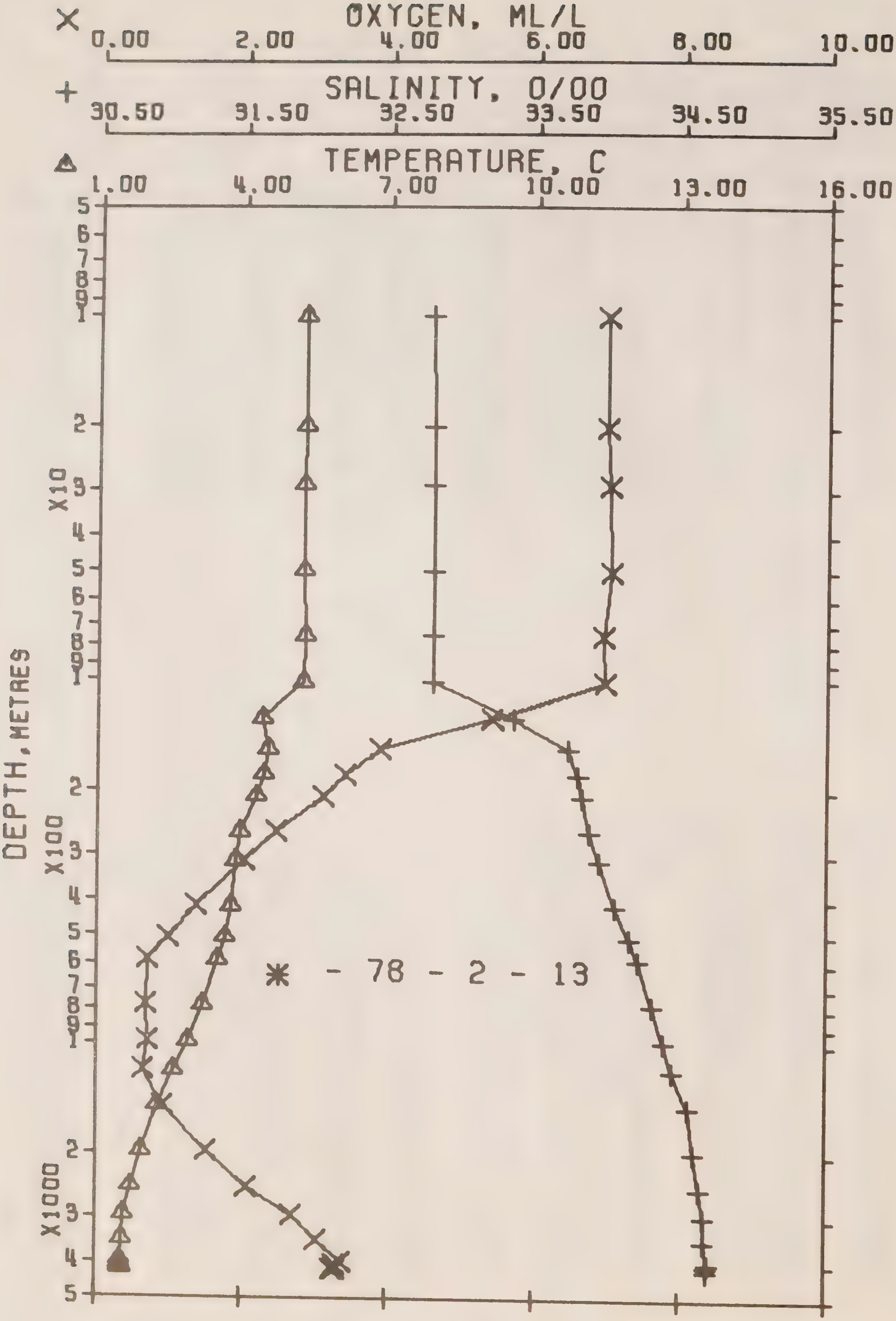
2.00
4.00
6.00
8.00
10.00
+ SALINITY, 0/00
30.50
31.50
32.50
33.50
34.50
35.50
△ TEMPERATURE, C
1.00
4.00
7.00
10.00
13.00
16.00
DEPTH, METRES
X10
X100
X1000
✱ - 78 - 2 - 3

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 3 DATE 12/ 2/78 GMT 20.7
POSITION 49-34.0 N, 138-40.0 W STATION 10
OBSERVED DATA

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	6.67	32.613	0	25.608	238.8	6.67	238.8	.00	.00		1475.
10	6.73	32.614	10	25.601	239.6	6.73	239.5	.24	.01		1475.
20	6.70	32.611	20	25.603	239.6	6.70	239.3	.48	.05		1475.
29	6.67	32.612	29	25.607	239.3	6.67	238.9	.70	.10		1475.
49	6.69	32.612	49	25.605	239.8	6.69	239.1	1.19	.30		1475.
99	6.10	33.136	98	26.092	194.0	6.09	192.7	2.25	1.09		1475.
148	5.60	33.759	147	26.645	142.1	5.59	140.2	3.07	2.11		1474.
197	5.06	33.840	196	26.772	130.4	5.04	128.1	3.74	3.29		1473.
295	4.39	33.903	293	26.896	119.2	4.37	116.3	4.96	6.34		1472.
393	4.13	33.997	390	26.998	110.3	4.10	106.6	6.08	10.27		1472.
490	3.92	34.087	486	27.091	102.1	3.88	97.7	7.11	14.90		1473.
587	3.70	34.162	582	27.173	95.0	3.66	89.9	8.06	20.13		1474.
782	3.31	34.278	775	27.303	83.6	3.26	77.5	9.80	32.21		1476.
977	3.00	34.360	968	27.397	75.4	2.93	68.5	11.34	46.08		1478.
1174	2.72	34.428	1162	27.476	68.5	2.64	60.9	12.75	61.53		1480.
1473	2.37	34.503	1457	27.566	60.6	2.27	52.3	14.68	87.45		1483.

INTERPOLATED TO STANDARD PRESSURE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	6.67	32.613	0	25.608	238.8	6.67	238.8	.00	.00		1475.
10	6.73	32.614	10	25.601	239.6	6.73	239.5	.24	.01		1475.
20	6.70	32.611	20	25.603	239.6	6.70	239.3	.48	.05		1475.
30	6.67	32.612	30	25.607	239.3	6.67	238.9	.72	.11		1475.
50	6.68	32.623	50	25.615	238.8	6.67	238.2	1.20	.31		1475.
75	6.33	32.928	75	25.899	212.1	6.33	211.1	1.77	.67		1475.
100	6.08	33.157	99	26.111	192.2	6.07	190.9	2.27	1.12		1475.
125	5.81	33.499	124	26.415	163.7	5.80	162.1	2.72	1.63		1474.
150	5.57	33.763	149	26.651	141.6	5.56	139.7	3.10	2.16		1474.
175	5.29	33.806	174	26.719	135.2	5.27	133.1	3.44	2.73		1473.
200	5.04	33.842	199	26.776	130.0	5.02	127.7	3.77	3.36		1473.
225	4.84	33.860	223	26.813	126.7	4.82	124.2	4.09	4.06		1473.
250	4.67	33.877	248	26.846	123.8	4.65	121.1	4.41	4.81		1472.
300	4.38	33.908	298	26.902	118.7	4.35	115.7	5.01	6.51		1472.
400	4.11	34.004	397	27.006	109.6	4.08	105.8	6.15	10.58		1473.
500	3.90	34.095	496	27.100	101.3	3.86	96.8	7.21	15.41		1473.
600	3.67	34.171	595	27.183	94.1	3.63	88.9	8.18	20.88		1474.
700	3.46	34.233	694	27.253	87.9	3.41	82.3	9.09	26.90		1475.
800	3.28	34.286	793	27.313	82.7	3.22	76.6	9.94	33.42		1476.
900	3.11	34.330	892	27.362	78.4	3.05	71.8	10.75	40.39		1477.
1000	2.96	34.369	990	27.407	74.5	2.90	67.5	11.51	47.79		1478.
1200	2.69	34.435	1188	27.485	67.7	2.60	60.0	12.93	63.69		1480.

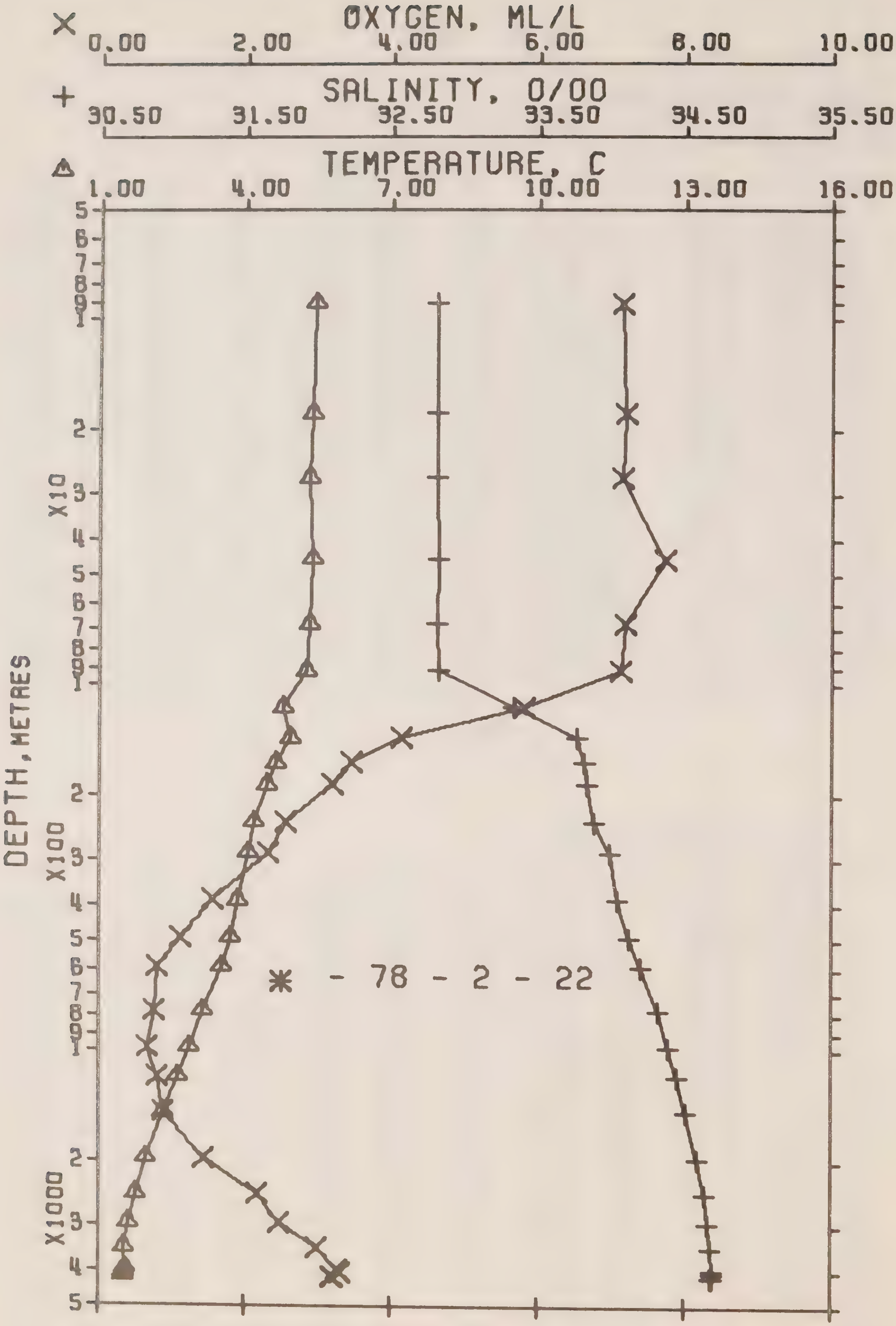

OXYGEN, ML/L
0.00
2.00
4.00
6.00
8.00
10.00
SALINITY, 0/00
30.50
31.50
32.50
33.50
34.50
35.50
TEMPERATURE, C
1.00
4.00
7.00
10.00
13.00
16.00
DEPTH, METRES
X10
X100
X1000
* - 78 - 2 - 13

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 13 DATE 23/ 2/78 GMT 18.8
POSITION 50- .0 N, 145- .0 W STATION P
OBSERVED DATA

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	5.34	32.803	0	25.921	209.1	5.34	209.1	.00	.00	6.98	1469.
10	5.26	32.795	10	25.924	208.9	5.26	208.8	.21	.01	6.96	1469.
20	5.26	32.804	20	25.931	208.3	5.26	208.1	.42	.04	6.95	1469.
29	5.24	32.799	29	25.929	208.6	5.24	208.3	.61	.09	7.00	1470.
50	5.24	32.799	50	25.929	208.8	5.24	208.2	1.05	.27	7.02	1470.
75	5.25	32.800	75	25.929	209.1	5.24	208.3	1.58	.61	6.92	1470.
102	5.24	32.796	101	25.927	209.5	5.23	208.4	2.12	1.10	6.95	1471.
128	4.40	33.349	127	26.457	159.3	4.39	158.1	2.61	1.66	5.40	1468.
155	4.50	33.717	154	26.737	133.0	4.49	131.5	3.00	2.23	3.88	1470.
182	4.43	33.793	181	26.805	126.9	4.42	125.0	3.35	2.84	3.39	1470.
210	4.27	33.819	208	26.843	123.5	4.25	121.5	3.69	3.52	3.10	1470.
263	3.94	33.872	261	26.919	116.5	3.92	114.2	4.33	5.06	2.46	1469.
316	3.86	33.942	314	26.982	110.9	3.84	108.1	4.94	6.85	2.02	1470.
419	3.75	34.050	416	27.079	102.5	3.72	98.9	6.04	10.96	1.37	1471.
513	3.63	34.148	509	27.169	94.7	3.59	90.3	6.96	15.36	.98	1473.
592	3.48	34.214	587	27.236	88.8	3.44	83.9	7.69	19.42	.70	1473.
788	3.18	34.310	781	27.341	79.8	3.13	73.9	9.34	31.00	.69	1475.
991	2.88	34.388	981	27.430	72.1	2.81	65.3	10.87	44.89	.69	1478.
1193	2.60	34.455	1181	27.508	65.3	2.52	57.9	12.26	60.37	.64	1480.
1496	2.27	34.558	1480	27.618	55.5	2.17	47.3	14.09	85.43	.91	1483.
2001	1.93	34.602	1977	27.680	50.5	1.79	41.2	16.76	133.00	1.52	1490.
2506	1.71	34.637	2472	27.725	46.9	1.53	36.7	19.21	189.25	2.08	1498.
3011	1.57	34.666	2967	27.759	44.5	1.35	33.3	21.51	254.05	2.70	1506.
3517	1.54	34.668	3462	27.763	45.3	1.27	32.6	23.77	329.19	3.05	1515.
4027	1.51	34.697	3959	27.788	44.2	1.18	29.8	26.06	417.18	3.37	1523.
4129	1.52	34.690	4059	27.782	45.1	1.18	30.4	26.52	436.19	3.30	1525.
4222	1.52	34.692	4149	27.783	45.1	1.17	30.1	26.93	453.94	3.26	1527.
4232	1.53	34.693	4159	27.783	45.3	1.18	30.1	26.98	455.94	3.30	1527.

INTERPOLATED TO STANDARD PRESSURE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	5.34	32.803	0	25.921	209.1	5.34	209.1	.00	.00	6.98	1469.
10	5.26	32.795	10	25.924	208.9	5.26	208.8	.21	.01	6.96	1469.
20	5.26	32.804	20	25.931	208.3	5.26	208.1	.42	.04	6.95	1469.
30	5.24	32.799	30	25.929	208.6	5.24	208.3	.63	.10	7.00	1470.
50	5.24	32.799	50	25.929	208.8	5.24	208.2	1.05	.27	7.02	1470.
75	5.25	32.800	75	25.929	209.1	5.24	208.3	1.58	.61	6.92	1470.
100	5.24	32.796	99	25.927	209.5	5.23	208.4	2.09	1.07	6.94	1471.
125	4.48	33.294	124	26.404	164.3	4.47	163.1	2.56	1.60	5.55	1469.
150	4.48	33.653	149	26.689	137.6	4.47	136.1	2.93	2.13	4.14	1470.
175	4.45	33.774	174	26.788	128.4	4.43	126.7	3.26	2.67	3.52	1470.
200	4.32	33.810	199	26.830	124.6	4.31	122.6	3.58	3.27	3.20	1470.
225	4.17	33.836	223	26.867	121.3	4.15	119.2	3.88	3.94	2.90	1470.
250	4.01	33.860	248	26.902	118.1	4.00	115.8	4.18	4.66	2.60	1469.
300	3.88	33.922	298	26.964	112.5	3.86	109.9	4.76	6.27	2.14	1470.
400	3.77	34.032	397	27.063	103.9	3.74	100.5	5.84	10.12	1.48	1471.
500	3.65	34.135	496	27.157	95.7	3.61	91.5	6.84	14.70	1.03	1472.
600	3.47	34.218	595	27.241	88.4	3.42	83.5	7.76	19.85	.70	1473.
700	3.30	34.270	694	27.297	83.5	3.26	78.1	8.62	25.54	.69	1474.
800	3.16	34.315	793	27.346	79.3	3.11	73.4	9.43	31.76	.69	1475.
900	3.01	34.355	891	27.393	75.3	2.94	68.9	10.20	38.45	.69	1477.
1000	2.87	34.391	990	27.434	71.8	2.80	65.0	10.94	45.58	.69	1478.
1200	2.59	34.458	1188	27.511	65.0	2.51	57.6	12.31	60.91	.65	1480.
1500	2.27	34.558	1483	27.619	55.5	2.17	47.3	14.11	85.73	.92	1484.
2000	1.93	34.602	1976	27.680	50.5	1.79	41.2	16.75	132.85	1.52	1490.
2500	1.71	34.637	2467	27.725	47.0	1.54	36.8	19.18	188.58	2.08	1498.
3000	1.57	34.665	2956	27.758	44.6	1.35	33.3	21.46	252.57	2.68	1506.
3500	1.54	34.668	3445	27.763	45.3	1.27	32.6	23.69	326.40	3.03	1514.
4000	1.51	34.696	3933	27.787	44.2	1.19	30.0	25.94	412.36	3.36	1523.
4100	1.52	34.692	4030	27.784	44.8	1.18	30.2	26.38	430.67	3.32	1524.
4200	1.52	34.692	4128	27.783	45.1	1.17	30.2	26.84	449.74	3.27	1526.



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△ TEMPERATURE, C
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DEPTH, METRES
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X100
X1000
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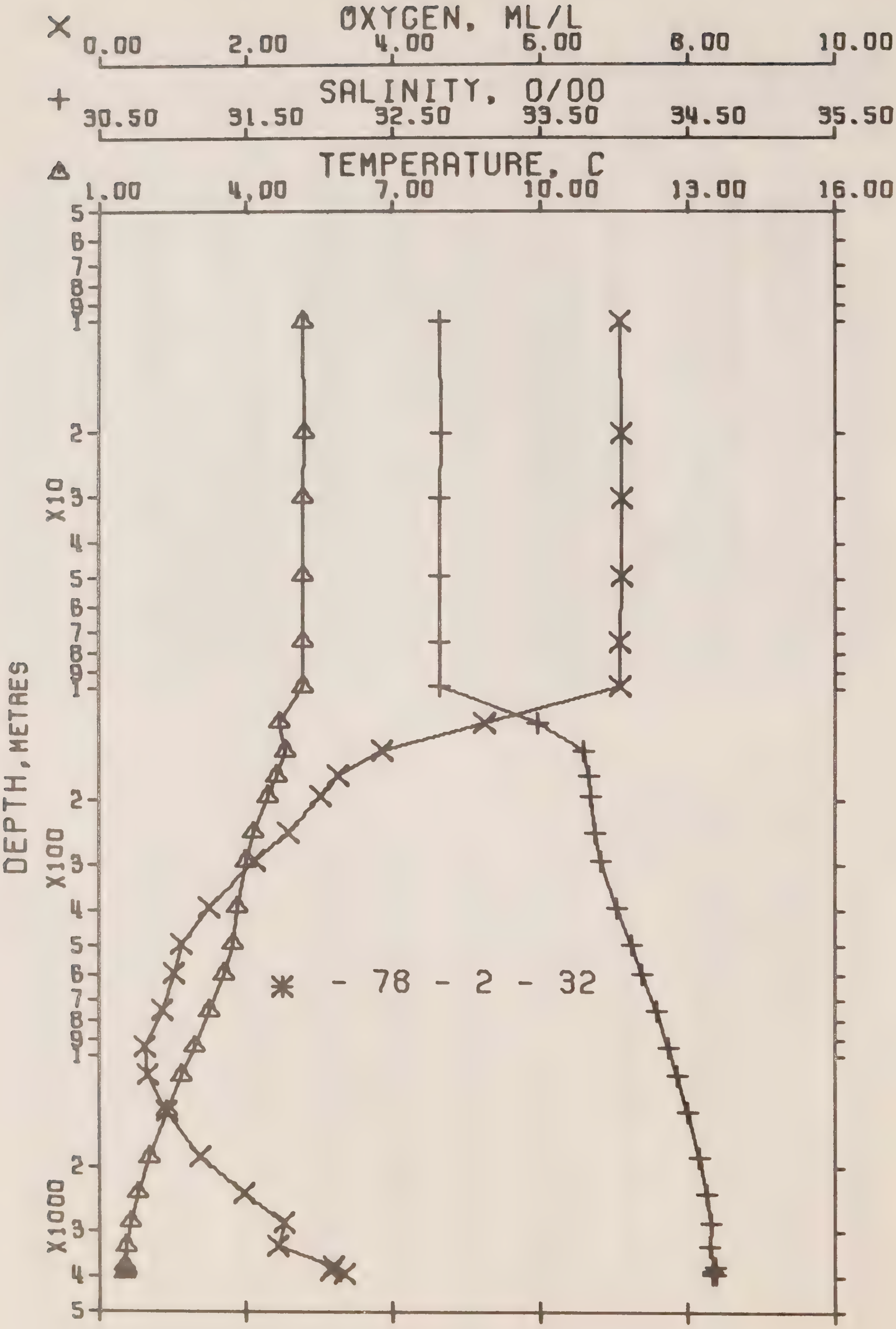
* - 78 - 2 - 22

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 22 DATE 1/ 3/78 GMT 18.2
POSITION 50- .0 N, 145- .0 W STATION P
OBSERVED DATA

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	5.38	32.805	0	25.918	209.4	5.38	209.4	.00	.00	7.07	1470.
9	5.45	32.808	9	25.912	210.0	5.45	209.9	.19	.01	7.14	1470.
18	5.39	32.806	18	25.918	209.6	5.39	209.4	.38	.04	7.18	1470.
27	5.32	32.811	27	25.930	208.5	5.32	208.2	.57	.08	7.13	1470.
45	5.37	32.819	45	25.930	208.7	5.37	208.2	.95	.22	7.72+	1470.
68	5.32	32.815	68	25.933	208.6	5.31	207.9	1.43	.50	7.18	1471.
92	5.25	32.825	91	25.949	207.3	5.24	206.4	1.92	.90	7.11	1471.
116	4.78	33.327	115	26.398	164.9	4.77	163.7	2.37	1.37	5.80	1470.
140	4.92	33.756	139	26.722	134.5	4.91	132.9	2.73	1.84	4.14	1471.
164	4.62	33.813	163	26.800	127.2	4.61	125.5	3.04	2.33	3.47	1471.
188	4.44	33.828	187	26.832	124.4	4.43	122.5	3.35	2.87	3.20	1470.
239	4.17	33.882	237	26.903	118.0	4.15	115.7	3.96	4.20	2.56	1470.
289	4.05	33.991	287	27.002	109.0	4.03	106.3	4.53	5.74	2.32	1470.
391	3.84	34.037	388	27.060	104.2	3.81	100.7	5.62	9.51	1.57	1471.
493	3.70	34.117	489	27.137	97.6	3.67	93.3	6.64	14.15	1.12	1472.
595	3.53	34.200	590	27.220	90.4	3.49	85.5	7.60	19.46	.80	1474.
783	3.14	34.320	776	27.352	78.6	3.09	72.8	9.18	30.54	.77	1475.
985	2.86	34.388	975	27.432	71.9	2.79	65.2	10.70	44.15	.67	1477.
1186	2.61	34.447	1174	27.501	65.9	2.53	58.6	12.08	59.46	.80	1480.
1489	2.32	34.506	1473	27.572	59.9	2.22	51.6	13.99	85.42	.88	1484.
1995	1.96	34.591	1971	27.669	51.6	1.82	42.3	16.81	135.35	1.44	1490.
2502	1.74	34.643	2468	27.728	46.9	1.56	36.5	19.30	192.44	2.19	1498.
3009	1.59	34.658	2965	27.751	45.4	1.37	34.0	21.62	257.62	2.48	1506.
3517	1.52	34.681	3462	27.775	44.1	1.25	31.5	23.89	333.20	3.01	1514.
4026	1.53	34.691	3958	27.782	44.9	1.20	30.4	26.14	419.80	3.29	1523.
4127	1.51	34.692	4057	27.784	44.8	1.17	30.1	26.60	438.73	3.31	1525.
4220	1.52	34.693	4147	27.784	45.1	1.17	30.1	27.01	456.37	3.22+	1527.
4230	1.52	34.681+	4157	27.775	45.9	1.17	31.0	27.06	458.38	3.19+	1527.

INTERPOLATED TO STANDARD PRESSURE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	5.38	32.805	0	25.918	209.4	5.38	209.4	.00	.00	7.07	1470.
10	5.44	32.808	10	25.913	209.9	5.44	209.8	.21	.01	7.15	1470.
20	5.37	32.807	20	25.921	209.3	5.37	209.1	.42	.04	7.17	1470.
30	5.33	32.813	30	25.930	208.5	5.33	208.2	.63	.10	7.25	1470.
50	5.36	32.818	50	25.931	208.6	5.35	208.1	1.05	.27	7.59	1470.
75	5.30	32.818	75	25.938	208.2	5.29	207.4	1.57	.60	7.16	1471.
100	5.07	33.013	99	26.117	191.4	5.07	190.4	2.09	1.06	6.62	1470.
125	4.84	33.500	124	26.529	152.6	4.83	151.3	2.51	1.55	5.13	1470.
150	4.79	33.781	149	26.756	131.3	4.78	129.7	2.86	2.03	3.85	1471.
175	4.54	33.820	174	26.815	125.9	4.52	124.1	3.18	2.56	3.34	1470.
200	4.37	33.842	199	26.850	122.8	4.36	120.8	3.49	3.16	3.04	1470.
225	4.24	33.868	223	26.885	119.6	4.22	117.4	3.79	3.81	2.72	1470.
250	4.14	33.908	248	26.927	115.8	4.12	113.4	4.09	4.53	2.50	1470.
300	4.02	33.997	298	27.009	108.4	4.00	105.6	4.65	6.09	2.23	1471.
400	3.83	34.045	397	27.067	103.6	3.80	100.0	5.71	9.88	1.53	1471.
500	3.69	34.123	496	27.143	97.0	3.65	92.8	6.71	14.49	1.10	1473.
600	3.52	34.204	595	27.224	90.0	3.48	85.1	7.65	19.72	.80	1474.
700	3.30	34.271	694	27.298	83.4	3.25	78.0	8.51	25.46	.78	1474.
800	3.11	34.326	793	27.360	78.0	3.06	72.1	9.32	31.60	.76	1475.
900	2.97	34.361	891	27.401	74.5	2.91	68.2	10.08	38.21	.71	1476.
1000	2.84	34.393	990	27.438	71.4	2.77	64.6	10.81	45.27	.68	1477.
1200	2.60	34.450	1188	27.505	65.6	2.51	58.2	12.17	60.57	.80	1480.
1500	2.31	34.508	1483	27.575	59.7	2.21	51.4	14.05	86.39	.89	1484.
2000	1.96	34.592	1976	27.670	51.6	1.82	42.2	16.83	135.84	1.45	1491.
2500	1.74	34.643	2467	27.728	46.9	1.56	36.5	19.29	192.26	2.19	1498.
3000	1.59	34.658	2956	27.751	45.4	1.37	34.0	21.58	256.40	2.48	1506.
3500	1.52	34.680	3445	27.774	44.2	1.25	31.5	23.81	330.49	2.99	1514.
4000	1.53	34.691	3933	27.781	44.8	1.21	30.5	26.03	415.10	3.28	1523.
4100	1.52	34.692	4030	27.783	44.8	1.18	30.2	26.47	433.62	3.31	1524.
4200	1.52	34.693	4128	27.784	45.0	1.17	30.1	26.92	452.58	3.24	1526.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TEMPERATURE, C
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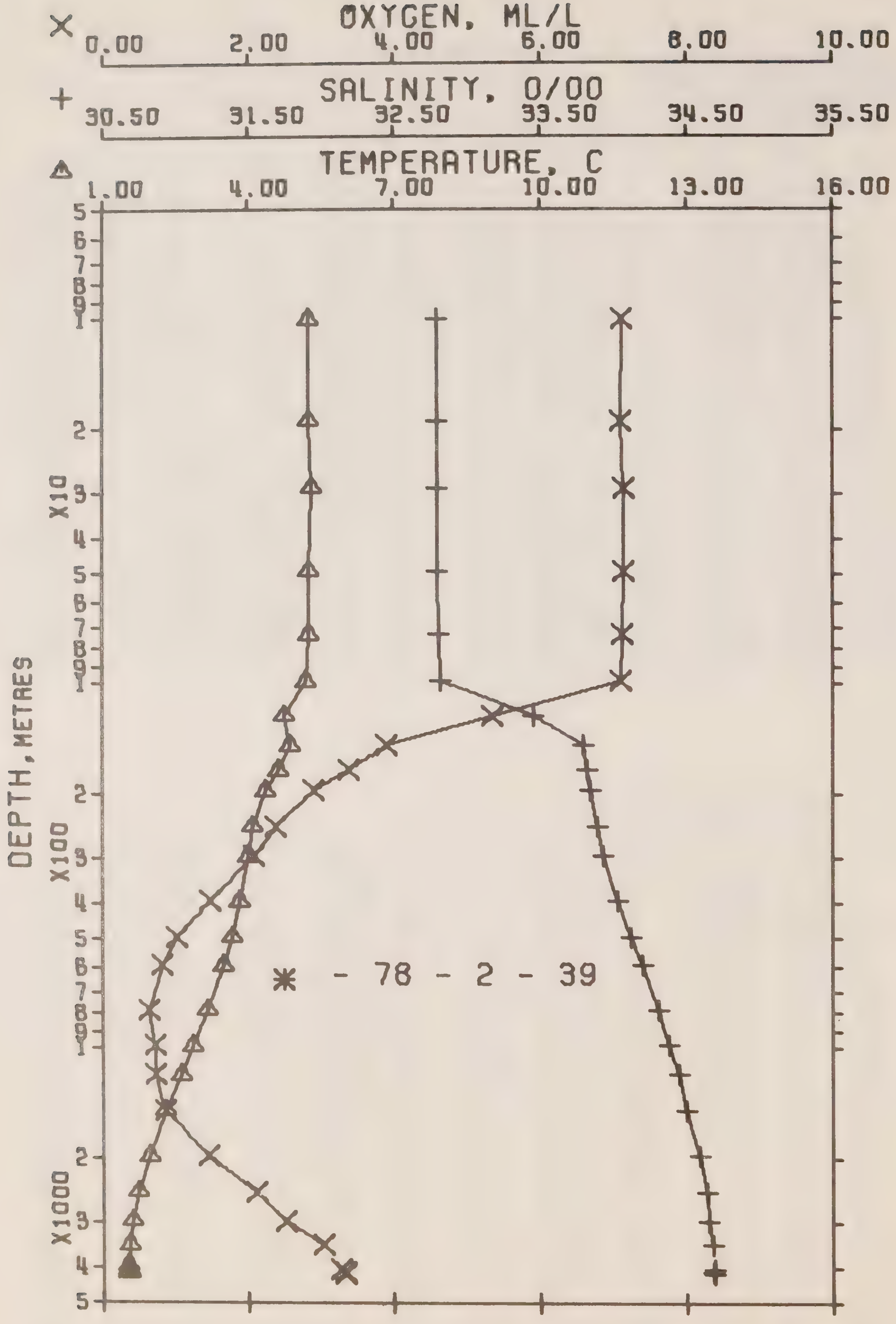
X1000
* - 78 - 2 - 32

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 32 DATE 9/ 3/78 GMT 18.2
POSITION 50- .0 N, 145- .0 W STATION P
OBSERVED DATA

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	5.20	32.820	0	25.951	206.3	5.20	206.3	.00	.00	7.08	1469.
10	5.17	32.825	10	25.958	205.7	5.17	205.6	.21	.01	7.08	1469.
20	5.20	32.829	20	25.958	205.8	5.20	205.6	.41	.04	7.10	1469.
30	5.18	32.825	30	25.957	206.0	5.18	205.7	.62	.10	7.10	1469.
49	5.18	32.824	49	25.956	206.2	5.18	205.7	1.02	.26	7.09	1470.
74	5.17	32.824	74	25.957	206.4	5.16	205.6	1.54	.58	7.08	1470.
99	5.17	32.825	98	25.958	206.5	5.16	205.5	2.05	1.04	7.08	1470.
124	4.70	33.479	123	26.527	152.7	4.69	151.4	2.50	1.55	5.25	1470.
148	4.81	33.786	147	26.758	131.1	4.80	129.5	2.84	2.02	3.86	1471.
173	4.62	33.831	172	26.815	126.0	4.61	124.1	3.17	2.55	3.27	1471.
197	4.46	33.844	196	26.842	123.5	4.45	121.5	3.47	3.12	3.03	1470.
247	4.14	33.871	245	26.897	118.5	4.12	116.2	4.07	4.47	2.58	1470.
296	4.00	33.913	294	26.945	114.4	3.98	111.7	4.64	6.07	2.12	1470.
396	3.83	34.020	393	27.047	105.4	3.80	101.9	5.74	9.93	1.51	1471.
498	3.74	34.122	494	27.137	97.7	3.70	93.3	6.77	14.64	1.12	1473.
602	3.55	34.190	597	27.210	91.4	3.51	86.4	7.75	20.15	1.03	1474.
760	3.24	34.266	753	27.316	82.1	3.19	76.3	9.12	29.62	.86	1475.
949	2.95	34.370	940	27.409	74.0	2.89	67.3	10.59	42.42	.61	1477.
1140	2.69	34.427	1128	27.478	68.0	2.61	60.7	11.94	56.77	.67	1479.
1428	2.39	34.496	1413	27.559	61.1	2.29	53.0	13.80	81.10	.92	1483.
1914	2.01	34.579	1891	27.656	52.8	1.88	43.6	16.56	128.00	1.38	1489.
2401	1.78	34.632	2369	27.716	47.9	1.61	37.6	19.00	181.54	1.98	1497.
2884	1.63	34.661	2843	27.750	45.3	1.42	34.1	21.24	241.86	2.52	1504.
3359	1.54	34.651+	3308	27.749	46.1	1.28	34.0	23.42	311.29	2.44+	1512.
3820	1.51	34.690	3758	27.782	44.1	1.21	30.5	25.48	386.36	3.20	1520.
3911	1.54	34.674+	3846	27.767	45.9	1.23	31.9	25.89	402.43	3.17	1521.
3992	1.51	34.688	3925	27.781	44.7	1.19	30.5	26.24	416.81	3.34	1523.
4000	1.51	34.672	3933	27.768	45.8	1.19	31.8	26.28	418.32		1523.

INTERPOLATED TO STANDARD PRESSURE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	5.20	32.820	0	25.951	206.3	5.20	206.3	.00	.00	7.08	1469.
10	5.17	32.825	10	25.958	205.7	5.17	205.6	.21	.01	7.08	1469.
20	5.20	32.829	20	25.958	205.8	5.20	205.6	.41	.04	7.10	1469.
30	5.18	32.825	30	25.957	206.0	5.18	205.7	.62	.10	7.10	1469.
50	5.18	32.824	50	25.956	206.2	5.18	205.7	1.03	.26	7.09	1470.
75	5.17	32.824	75	25.957	206.4	5.16	205.6	1.55	.59	7.08	1470.
100	5.14	32.864	99	25.992	203.3	5.13	202.3	2.08	1.07	6.97	1470.
125	4.71	33.495	124	26.539	151.6	4.70	150.3	2.52	1.57	5.17	1470.
150	4.79	33.790	149	26.763	130.7	4.78	129.1	2.87	2.06	3.81	1471.
175	4.61	33.832	174	26.817	125.8	4.59	123.9	3.19	2.59	3.25	1471.
200	4.44	33.846	199	26.845	123.2	4.43	121.2	3.50	3.18	3.00	1470.
225	4.27	33.860	223	26.875	120.6	4.26	118.4	3.80	3.84	2.76	1470.
250	4.13	33.874	248	26.901	118.3	4.11	115.9	4.10	4.57	2.55	1470.
300	3.99	33.918	298	26.950	114.0	3.97	111.3	4.68	6.20	2.09	1470.
400	3.83	34.024	397	27.051	105.1	3.80	101.6	5.78	10.10	1.49	1471.
500	3.74	34.123	496	27.139	97.5	3.70	93.2	6.79	14.73	1.12	1473.
600	3.55	34.189	595	27.209	91.5	3.51	86.5	7.73	20.03	1.03	1474.
700	3.35	34.252	694	27.279	85.3	3.30	79.8	8.62	25.89	.92	1475.
800	3.17	34.305	793	27.338	80.2	3.12	74.2	9.45	32.20	.80	1476.
900	3.02	34.350	891	27.387	75.9	2.96	69.4	10.22	38.96	.67	1477.
1000	2.88	34.386	990	27.429	72.3	2.81	65.4	10.96	46.12	.63	1478.
1200	2.62	34.443	1188	27.497	66.4	2.54	59.0	12.35	61.62	.72	1480.
1500	2.33	34.510	1483	27.575	59.7	2.22	51.4	14.23	87.54	1.00	1484.
2000	1.97	34.589	1976	27.668	51.8	1.83	42.4	17.01	136.97	1.50	1491.
2500	1.75	34.638	2467	27.724	47.3	1.57	36.9	19.47	193.35	2.10	1498.
3000	1.61	34.658	2956	27.750	45.5	1.38	34.1	21.77	257.64	2.50	1506.
3500	1.53	34.663	3445	27.760	45.5	1.26	32.9	24.07	333.79	2.68	1514.
4000	1.51	34.672	3933	27.768	45.8	1.19	31.8	26.28	418.32	.00	1523.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0.00
2.00
4.00
6.00
8.00
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33.50
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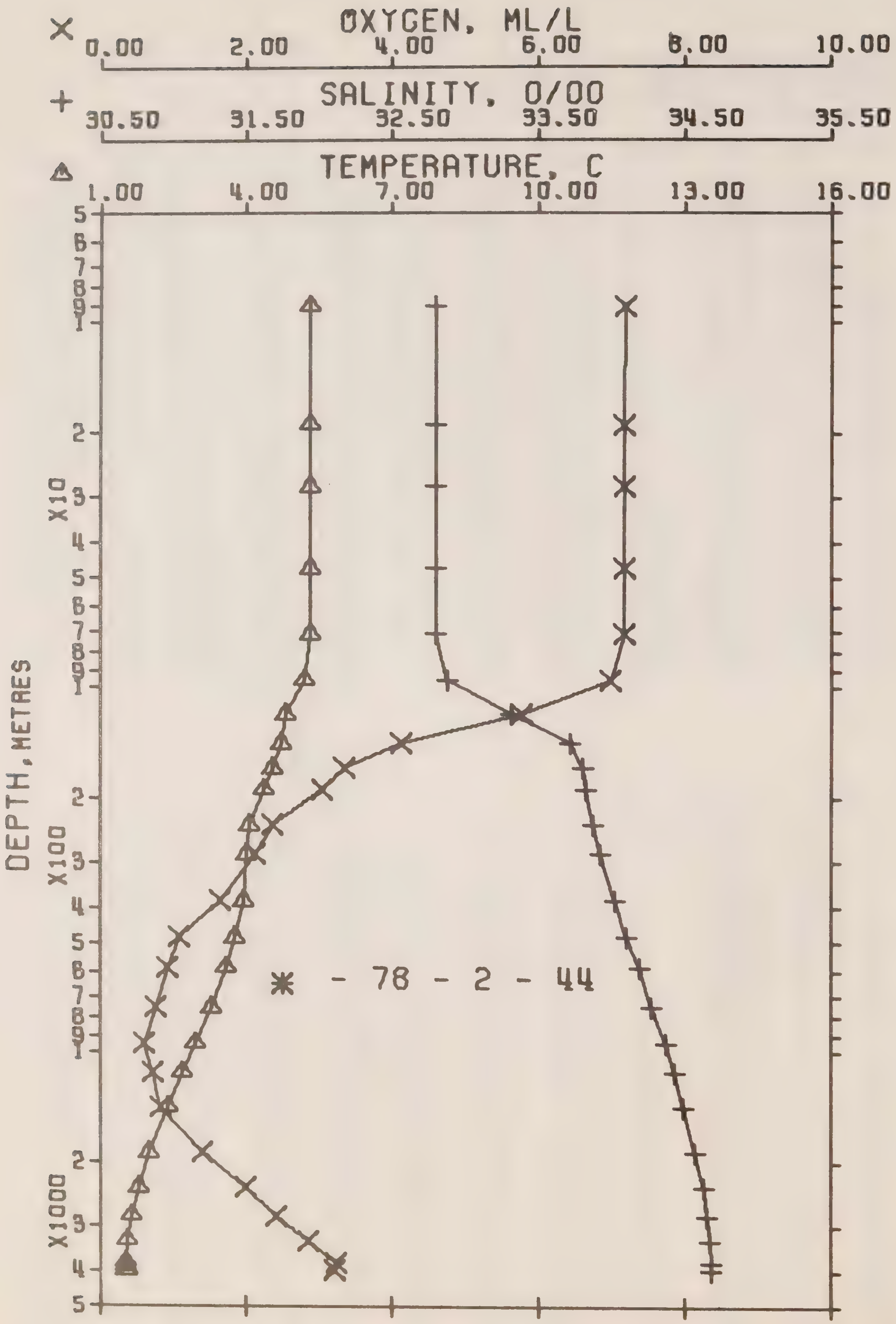
TEMPERATURE, C
1.00
4.00
7.00
10.00
13.00
16.00
DEPTH, METRES
X10
X100
X1000
* - 78 - 2 - 39

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 39 DATE 15/ 3/78 GMT 18.2
POSITION 50- .0 N, 145- .0 W
OBSERVED DATA STATION P

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	5.28	32.805	0	25.930	208.3	5.28	208.3	.00	.00	7.12	1469.
10	5.27	32.804	10	25.930	208.3	5.27	208.2	.21	.01	7.11	1469.
19	5.27	32.804	19	25.930	208.4	5.27	208.2	.40	.04	7.11	1470.
29	5.31	32.805	29	25.926	208.9	5.31	208.6	.61	.09	7.13	1470.
49	5.27	32.803	49	25.929	208.8	5.27	208.3	1.03	.26	7.14	1470.
73	5.26	32.807	73	25.933	208.6	5.25	207.8	1.53	.57	7.11	1470.
99	5.21	32.821	98	25.950	207.3	5.20	206.2	2.07	1.05	7.10	1471.
123	4.76	33.454	122	26.501	155.2	4.75	153.9	2.51	1.54	5.35	1470.
148	4.86	33.786	147	26.752	131.7	4.85	130.0	2.87	2.04	3.91	1471.
173	4.62	33.824	172	26.809	126.5	4.61	124.7	3.19	2.57	3.38	1471.
197	4.35	33.838	196	26.849	122.8	4.34	120.8	3.50	3.14	2.90	1470.
248	4.09	33.889	246	26.917	116.7	4.07	114.4	4.10	4.50	2.38	1470.
298	3.99	33.926	296	26.956	113.3	3.97	110.6	4.68	6.12	2.09	1470.
398	3.83	34.035	395	27.059	104.3	3.80	100.8	5.77	9.97	1.48	1471.
498	3.68	34.118	494	27.140	97.3	3.64	93.1	6.77	14.58	1.02	1472.
597	3.50	34.198	592	27.221	90.2	3.46	85.3	7.70	19.75	.82	1473.
791	3.15	34.313	784	27.346	79.3	3.10	73.4	9.34	31.32	.65	1475.
991	2.87	34.383	981	27.427	72.4	2.80	65.6	10.85	45.01	.73	1477.
1191	2.61	34.449	1179	27.502	65.8	2.53	58.4	12.23	60.34	.72	1480.
1493	2.29	34.504	1477	27.573	59.7	2.19	51.6	14.12	86.24	.87	1483.
2000	1.95	34.591	1976	27.670	51.5	1.81	42.2	16.95	136.37	1.45	1491.
2509	1.73	34.636	2475	27.723	47.3	1.55	36.9	19.44	193.75	2.12	1498.
3017	1.59	34.653	2973	27.747	45.7	1.37	34.4	21.79	259.94	2.52	1506.
3521	1.54	34.678	3466	27.771	44.6	1.27	31.8	24.06	335.80	3.04	1515.
4020	1.52	34.685*	3953	27.778	45.1	1.19	30.8	26.30	421.64	3.24*	1523.
4120	1.51	34.686	4050	27.779	45.1	1.17	30.6	26.75	440.29	3.28	1525.
4208	1.53	34.676+	4136	27.770	46.4	1.18	31.4	27.15	457.41	3.34	1526.
4219	1.52	34.688	4146	27.780	45.4	1.17	30.4	27.20	459.44	3.34	1527.

INTERPOLATED TO STANDARD PRESSURE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	5.28	32.805	0	25.930	208.3	5.28	208.3	.00	.00	7.12	1469.
10	5.27	32.804	10	25.930	208.3	5.27	208.2	.21	.01	7.11	1469.
20	5.27	32.804	20	25.930	208.5	5.27	208.3	.42	.04	7.11	1470.
30	5.31	32.805	30	25.926	208.9	5.31	208.6	.63	.10	7.13	1470.
50	5.27	32.803	50	25.929	208.8	5.27	208.3	1.04	.27	7.14	1470.
75	5.26	32.808	75	25.935	208.5	5.25	207.7	1.57	.60	7.11	1470.
100	5.18	32.860	99	25.984	204.0	5.17	203.0	2.10	1.08	6.99	1471.
125	4.77	33.485	124	26.524	153.0	4.76	151.7	2.54	1.58	5.21	1470.
150	4.84	33.789	149	26.757	131.2	4.83	129.6	2.90	2.08	3.86	1471.
175	4.60	33.825	174	26.812	126.2	4.59	124.4	3.22	2.61	3.35	1471.
200	4.34	33.841	199	26.853	122.4	4.32	120.5	3.53	3.20	2.87	1470.
225	4.20	33.867	223	26.888	119.3	4.18	117.1	3.83	3.86	2.60	1470.
250	4.09	33.891	248	26.919	116.5	4.07	114.2	4.12	4.57	2.36	1470.
300	3.99	33.928	298	26.958	113.1	3.97	110.4	4.70	6.18	2.07	1470.
400	3.83	34.037	397	27.061	104.2	3.80	100.6	5.78	10.05	1.47	1471.
500	3.68	34.120	496	27.142	97.2	3.64	92.9	6.79	14.67	1.01	1472.
600	3.49	34.200	595	27.223	90.0	3.45	85.1	7.73	19.91	.81	1473.
700	3.30	34.263	694	27.292	84.0	3.25	78.6	8.60	25.67	.72	1474.
800	3.14	34.316	793	27.350	79.0	3.08	73.0	9.41	31.88	.65	1475.
900	2.99	34.353	891	27.392	75.3	2.93	69.0	10.18	38.56	.69	1476.
1000	2.86	34.386	990	27.431	72.0	2.79	65.3	10.92	45.70	.72	1478.
1200	2.60	34.451	1188	27.505	65.6	2.52	58.2	12.29	61.05	.72	1480.
1500	2.28	34.505	1483	27.575	59.6	2.18	51.4	14.16	86.84	.87	1484.
2000	1.95	34.591	1976	27.670	51.5	1.81	42.2	16.95	136.37	1.45	1491.
2500	1.73	34.635	2467	27.722	47.4	1.56	37.0	19.40	192.71	2.10	1498.
3000	1.59	34.652	2956	27.746	45.8	1.37	34.5	21.71	257.56	2.51	1506.
3500	1.54	34.677	3445	27.770	44.7	1.27	31.9	23.97	332.41	3.02	1514.
4000	1.52	34.684	3933	27.777	45.1	1.20	30.9	26.21	417.86	3.24	1523.
4100	1.51	34.686	4030	27.779	45.1	1.18	30.6	26.66	436.50	3.28	1524.
4200	1.53	34.677	4128	27.771	46.3	1.18	31.3	27.11	455.75	3.33	1526.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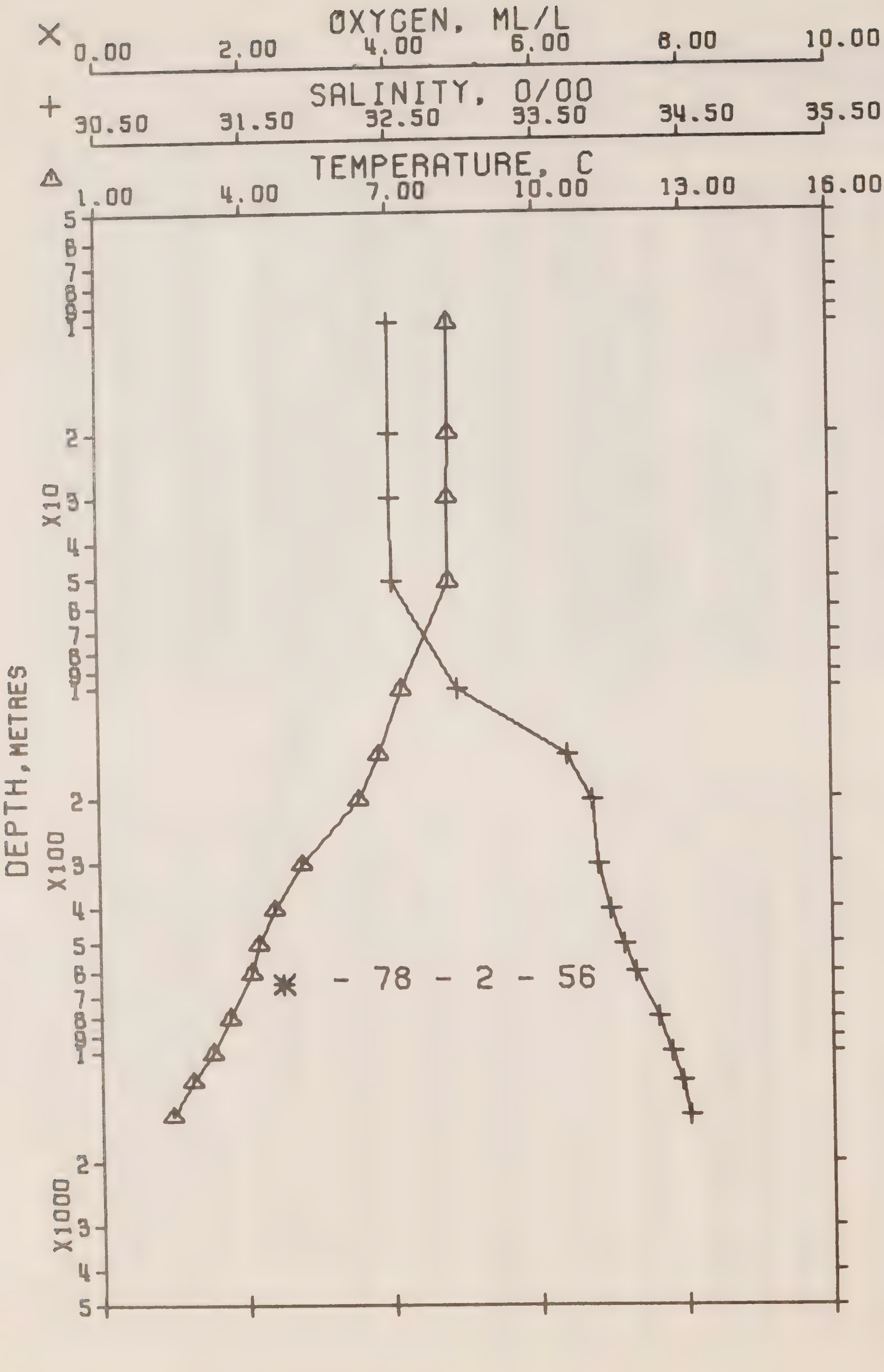
0.00 2.00 4.00 6.00 8.00 10.00
+ SALINITY, 0/00
30.50 31.50 32.50 33.50 34.50 35.50
△ TEMPERATURE, C
1.00 4.00 7.00 10.00 13.00 16.00
DEPTH, METRES
X10
X100
X1000
* - 78 - 2 - 44

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 44 DATE 23/ 3/78 GMT 17.9
POSITION 50- .0 N, 145- .0 W STATION P
OBSERVED DATA

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	5.38	32.804	0	25.917	209.4	5.38	209.4	.00	.00	7.18	1470.
9	5.33	32.805	9	25.924	208.9	5.33	208.8	.19	.01	7.17	1470.
19	5.32	32.805	19	25.925	208.9	5.32	208.7	.40	.04	7.16	1470.
28	5.32	32.803	28	25.923	209.1	5.32	208.8	.59	.08	7.17	1470.
47	5.33	32.804	47	25.923	209.4	5.33	208.8	.99	.24	7.17	1470.
71	5.31	32.803	71	25.925	209.4	5.30	208.7	1.50	.55	7.16	1471.
96	5.21	32.881	95	25.998	202.7	5.20	201.7	2.00	.98	6.98	1471.
119	4.82	33.306	118	26.377	166.9	4.81	165.7	2.43	1.44	5.75	1470.
143	4.72	33.712	142	26.709	135.6	4.71	134.1	2.79	1.93	4.12	1470.
167	4.54	33.805	166	26.803	127.0	4.53	125.3	3.11	2.43	3.35	1470.
191	4.36	33.825	190	26.838	123.8	4.35	121.9	3.41	2.98	3.04	1470.
240	4.05	33.870	238	26.906	117.6	4.03	115.4	4.00	4.26	2.35	1469.
288	4.01	33.916	286	26.946	114.2	3.99	111.6	4.56	5.77	2.12	1470.
386	3.94	34.019	383	27.035	106.6	3.91	103.1	5.64	9.48	1.65	1472.
486	3.75	34.105	482	27.123	98.9	3.72	94.7	6.66	14.04	1.08	1473.
588	3.59	34.191	583	27.207	91.6	3.55	86.7	7.64	19.35	.92	1474.
757	3.28	34.275	750	27.303	83.3	3.23	77.5	9.11	29.43	.76	1475.
950	2.96	34.367	941	27.406	74.3	2.90	67.6	10.63	42.62	.60	1477.
1143	2.69	34.429	1131	27.480	67.9	2.61	60.6	11.99	57.17	.73	1479.
1430	2.38	34.495	1415	27.559	61.1	2.28	53.0	13.84	81.42	.82	1483.
1907	2.00	34.568	1884	27.648	53.4	1.87	44.3	16.57	127.67	1.40	1489.
2383	1.79	34.626	2352	27.710	48.4	1.62	38.2	18.98	180.38	2.01	1496.
2864	1.64	34.655	2823	27.745	45.8	1.43	34.7	21.24	240.72	2.42	1504.
3351	1.54	34.670	3300	27.764	44.7	1.28	32.5	23.45	310.54	2.87	1512.
3848	1.52	34.682	3785	27.775	44.9	1.21	31.2	25.67	392.24	3.23	1520.
3949	1.51	34.683*	3883	27.777	44.9	1.19	30.9	26.12	410.17	3.22*	1522.
4040	1.51	34.684	3972	27.778	45.1	1.18	30.8	26.53	426.85	3.22	1523.
4050	1.53	34.676	3982	27.770	46.0	1.20	31.5	26.58	428.77	3.23	1524.

INTERPOLATED TO STANDARD PRESSURE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	5.38	32.804	0	25.917	209.4	5.38	209.4	.00	.00	7.18	1470.
10	5.33	32.805	10	25.924	208.9	5.33	208.8	.21	.01	7.17	1470.
20	5.32	32.805	20	25.925	208.9	5.32	208.7	.42	.04	7.16	1470.
30	5.32	32.803	30	25.923	209.2	5.32	208.8	.63	.10	7.17	1470.
50	5.33	32.804	50	25.923	209.4	5.32	208.8	1.05	.27	7.17	1470.
75	5.29	32.816	75	25.937	208.3	5.29	207.5	1.57	.60	7.13	1471.
100	5.13	32.968	99	26.076	195.4	5.12	194.3	2.09	1.06	6.72	1470.
125	4.79	33.417	124	26.468	158.3	4.78	157.0	2.53	1.57	5.30	1470.
150	4.66	33.740	149	26.738	133.0	4.65	131.4	2.89	2.07	3.88	1470.
175	4.48	33.812	174	26.815	125.9	4.47	124.1	3.21	2.60	3.25	1470.
200	4.30	33.834	199	26.851	122.6	4.28	120.6	3.52	3.19	2.91	1470.
225	4.14	33.857	223	26.887	119.4	4.12	117.3	3.82	3.85	2.55	1470.
250	4.04	33.880	248	26.915	116.8	4.02	114.6	4.12	4.56	2.30	1470.
300	4.00	33.930	298	26.959	113.1	3.98	110.4	4.69	6.18	2.05	1470.
400	3.91	34.032	397	27.049	105.4	3.88	101.8	5.79	10.07	1.56	1472.
500	3.73	34.118	496	27.135	97.8	3.69	93.5	6.80	14.73	1.06	1473.
600	3.57	34.198	595	27.215	91.0	3.52	85.9	7.74	20.01	.91	1474.
700	3.38	34.249	694	27.274	85.9	3.33	80.3	8.63	25.86	.81	1475.
800	3.20	34.297	793	27.329	81.1	3.15	75.0	9.46	32.25	.72	1476.
900	3.04	34.345	891	27.382	76.4	2.97	70.0	10.25	39.06	.64	1477.
1000	2.89	34.384	990	27.427	72.5	2.82	65.7	10.99	46.26	.64	1478.
1200	2.62	34.443	1188	27.497	66.4	2.54	58.9	12.38	61.77	.75	1480.
1500	2.32	34.507	1483	27.573	59.8	2.22	51.5	14.26	87.69	.92	1484.
2000	1.96	34.580	1976	27.661	52.3	1.82	43.0	17.06	137.48	1.53	1491.
2500	1.75	34.634	2467	27.719	47.7	1.57	37.3	19.54	194.33	2.12	1498.
3000	1.61	34.659	2956	27.751	45.5	1.39	34.0	21.86	259.32	2.55	1506.
3500	1.53	34.674	3445	27.768	44.8	1.26	32.1	24.11	333.77	2.98	1514.
4000	1.51	34.684	3933	27.777	45.0	1.19	30.9	26.36	419.53	3.22	1523.



X OXYGEN, ML/L
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+ SALINITY, 0/00
30.50 31.50 32.50 33.50 34.50 35.50
△ TEMPERATURE, C
1.00 4.00 7.00 10.00 13.00 16.00
DEPTH, METRES
X10
X100
X1000
5 6 7 8 9 1 2 3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9 1 2 3 4 5
* - 78 - 2 - 56

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 56 DATE 28/ 3/78 GMT 15.0
POSITION 49- 2.0 N, 130-40.0 W STATION 6
OBSERVED DATA

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	8.30	32.497	0	25.290	269.0	8.30	269.0	.00	.00		1481.
10	8.24	32.510	10	25.309	267.4	8.24	267.2	.27	.01		1481.
20	8.22	32.510	20	25.312	267.3	8.22	266.9	.54	.06		1481.
30	8.20	32.510	30	25.315	267.1	8.20	266.6	.81	.12		1481.
51	8.21	32.518	51	25.320	267.0	8.20	266.1	1.37	.36		1481.
102	7.21	32.964	101	25.811	220.9	7.20	219.4	2.59	1.30		1479.
153	6.73	33.699	152	26.454	160.7	6.72	158.3	3.56	2.55		1479.
203	6.30	33.871	202	26.645	143.0	6.28	140.1	4.32	3.92		1478.
305	5.13	33.915	303	26.823	126.7	5.11	123.1	5.69	7.46		1475.
406	4.58	33.995	403	26.949	115.5	4.55	111.2	6.91	11.87		1475.
507	4.24	34.061	503	27.053	106.2	4.20	101.2	8.02	17.07		1475.
608	4.09	34.163	603	27.134	99.3	4.04	93.5	9.06	22.96		1476.
810	3.63	34.313	803	27.300	84.7	3.57	77.7	10.91	36.32		1478.
1011	3.27	34.396	1001	27.401	76.0	3.20	68.1	12.52	51.19		1480.
1211	2.87	34.466	1199	27.493	67.6	2.79	59.2	13.96	67.47		1481.
1511	2.45	34.525	1495	27.577	60.1	2.35	51.2	15.86	93.84		1484.

INTERPOLATED TO STANDARD PRESSURE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	8.30	32.497	0	25.290	269.0	8.30	269.0	.00	.00		1481.
10	8.24	32.510	10	25.309	267.4	8.24	267.2	.27	.01		1481.
20	8.22	32.510	20	25.312	267.3	8.22	266.9	.54	.06		1481.
30	8.20	32.510	30	25.315	267.1	8.20	266.6	.81	.12		1481.
50	8.21	32.518	50	25.320	267.0	8.20	266.2	1.34	.34		1481.
75	7.66	32.765	75	25.594	241.3	7.65	240.1	1.97	.74		1480.
100	7.23	32.953	99	25.800	222.0	7.22	220.5	2.55	1.26		1479.
125	6.97	33.336	124	26.136	190.4	6.96	188.5	3.07	1.85		1479.
150	6.75	33.664	149	26.423	163.6	6.74	161.3	3.51	2.47		1479.
175	6.53	33.780	174	26.544	152.3	6.51	149.7	3.90	3.12		1478.
200	6.33	33.861	199	26.634	144.1	6.31	141.2	4.27	3.83		1478.
225	6.01	33.882	223	26.691	138.8	5.99	135.7	4.62	4.59		1477.
250	5.71	33.893	248	26.738	134.6	5.68	131.3	4.97	5.42		1476.
300	5.18	33.913	298	26.816	127.4	5.16	123.8	5.62	7.25		1475.
400	4.61	33.991	397	26.942	116.1	4.58	111.8	6.83	11.58		1475.
500	4.26	34.076	496	27.047	106.8	4.22	101.9	7.95	16.68		1475.
600	4.10	34.157	595	27.128	99.8	4.06	94.1	8.98	22.46		1476.
700	3.86	34.237	694	27.216	92.1	3.81	85.7	9.94	28.83		1477.
800	3.65	34.306	793	27.292	85.3	3.59	78.4	10.83	35.60		1478.
900	3.46	34.352	892	27.348	80.5	3.39	73.1	11.65	42.76		1478.
1000	3.29	34.392	991	27.396	76.4	3.22	68.5	12.44	50.36		1479.
1200	2.89	34.462	1188	27.488	68.0	2.81	59.7	13.88	66.53		1481.
1500	2.46	34.523	1484	27.574	60.3	2.36	51.5	15.79	92.79		1484.

Results of STP Observations

(P-78-2)

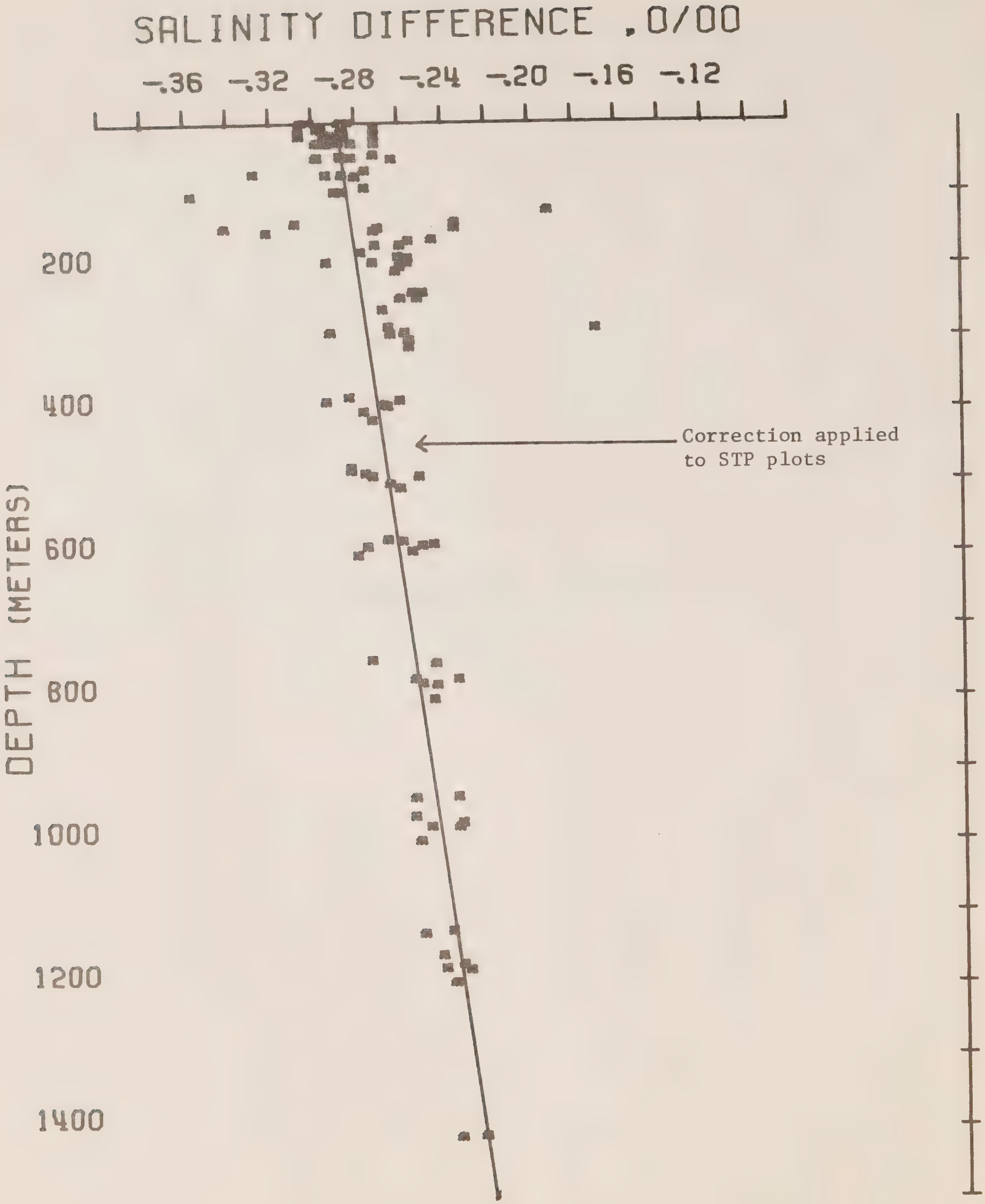


Figure 7. Salinity difference between STP and hydro data.

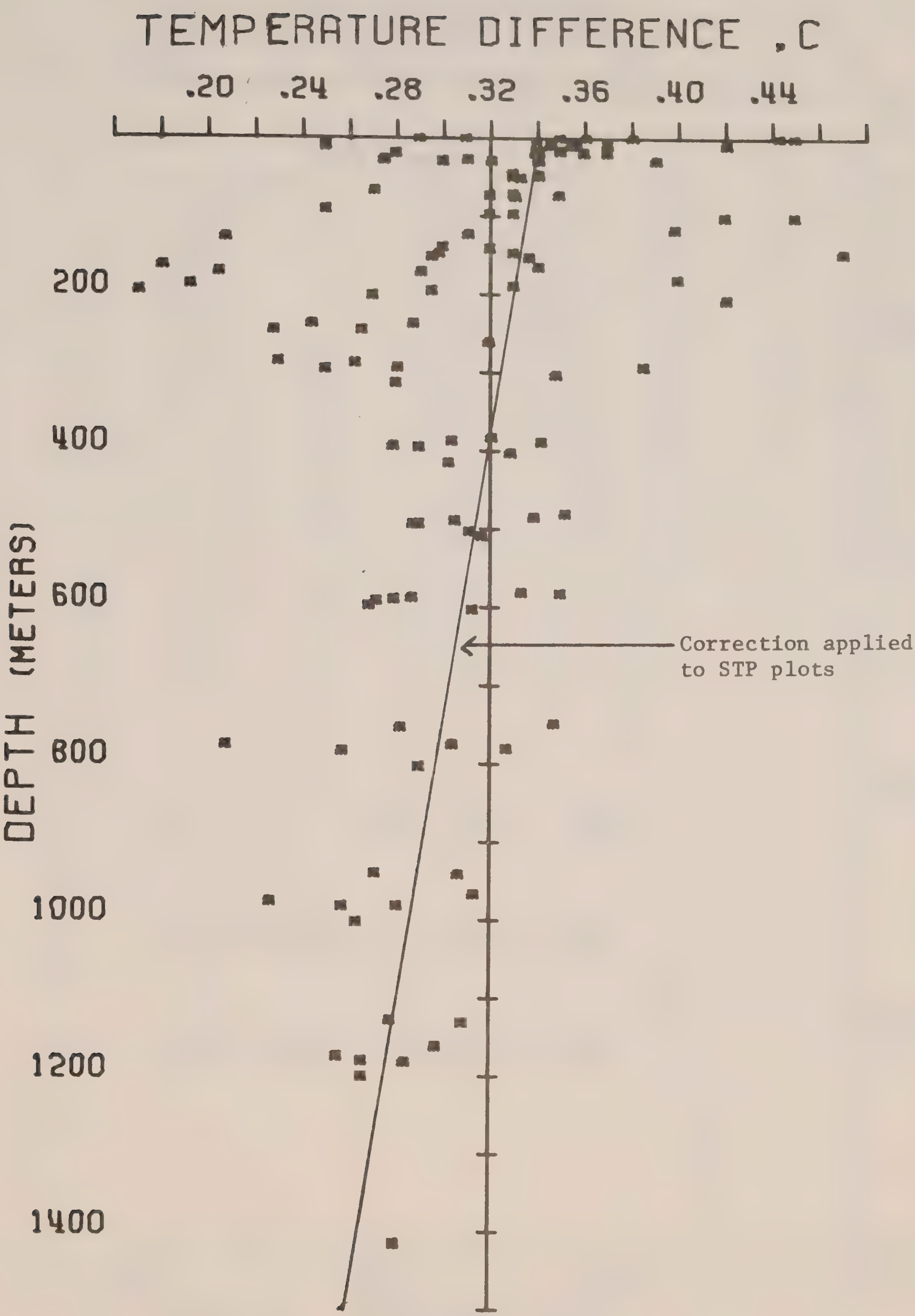
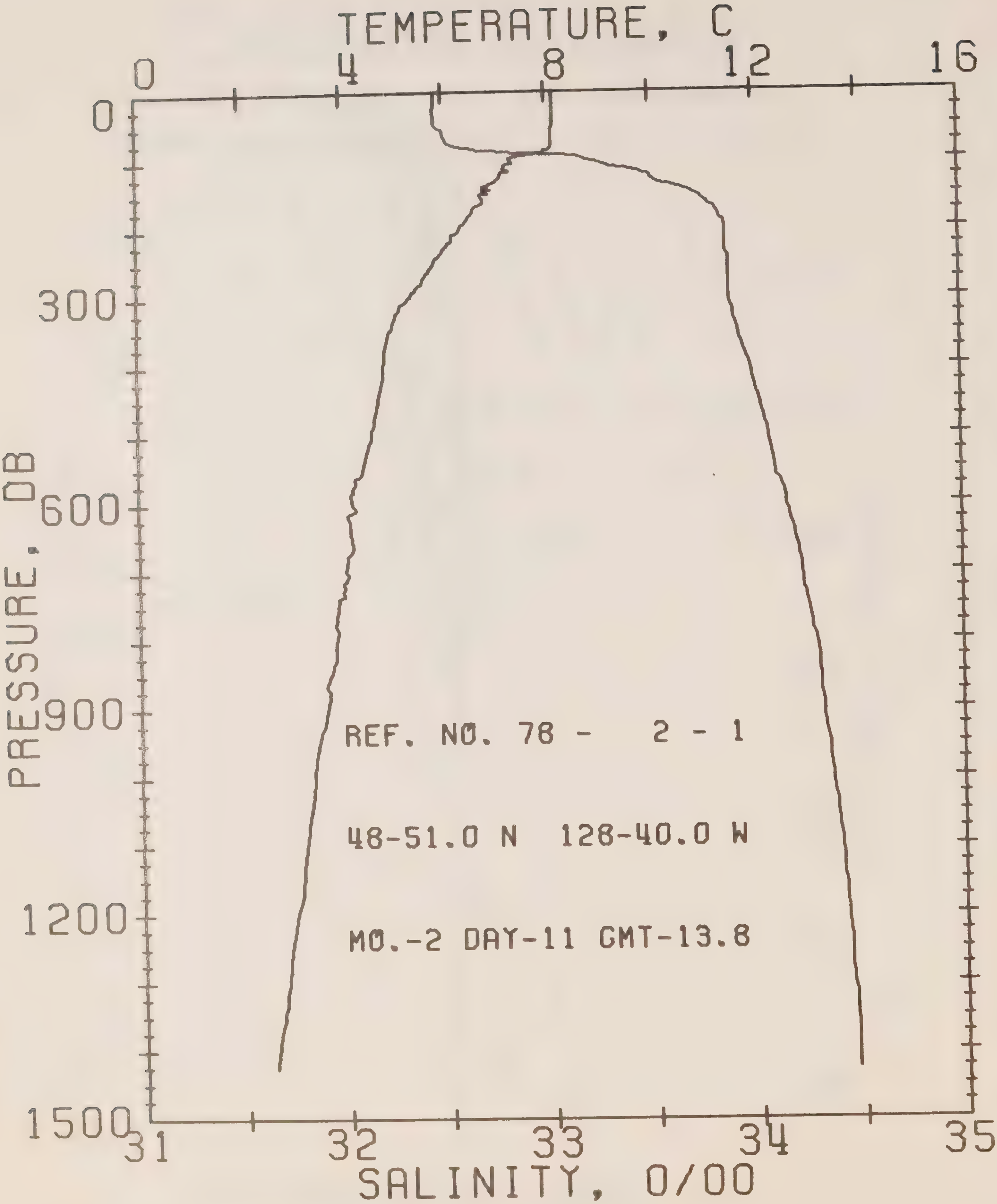
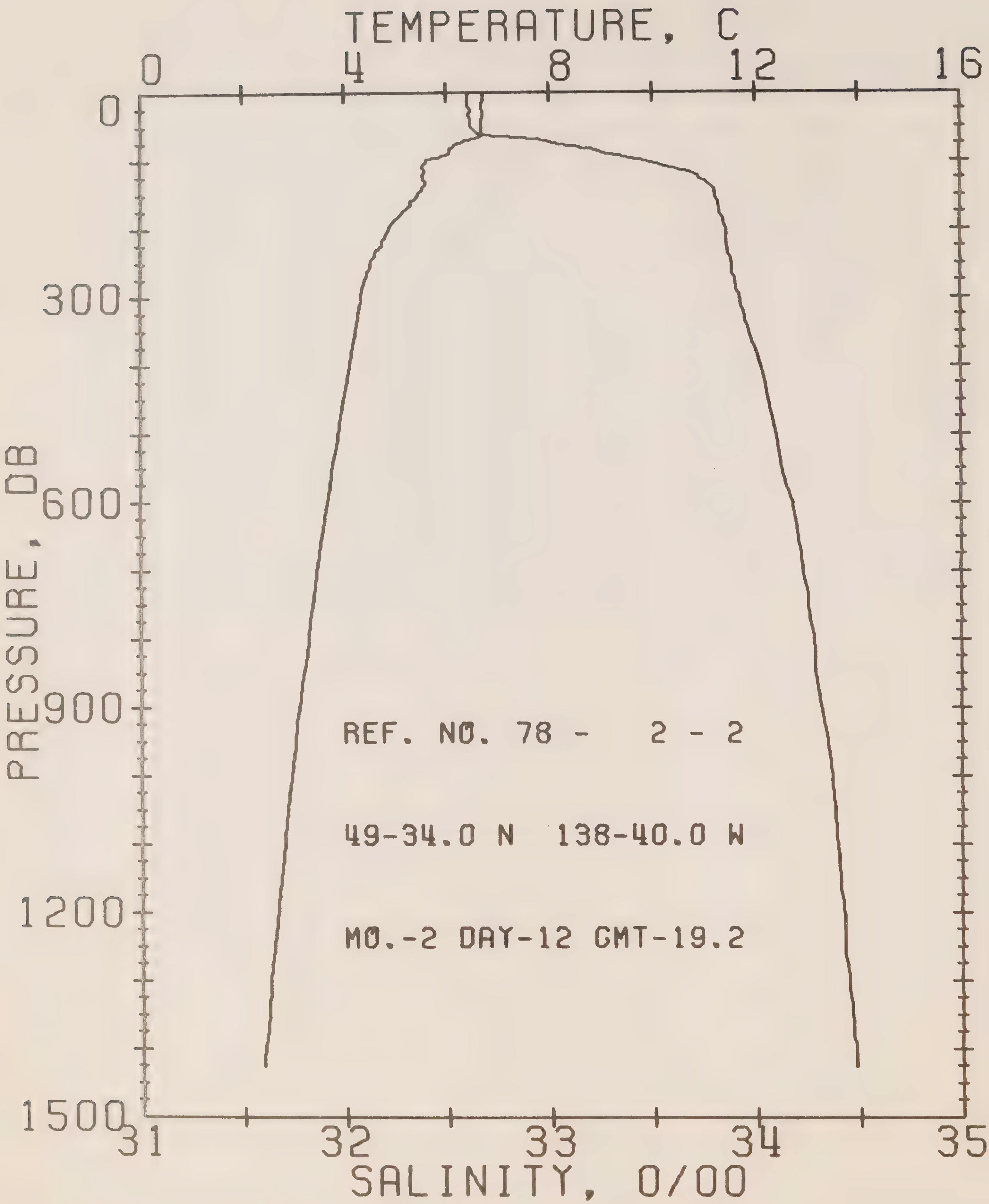


Figure 8. Temperature difference between STP and hydro data.


TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 2 - 1
48-51.0 N 128-40.0 W
MO.-2 DAY-11 GMT-13.8
31
32
33
34
35
SALINITY, 0/00

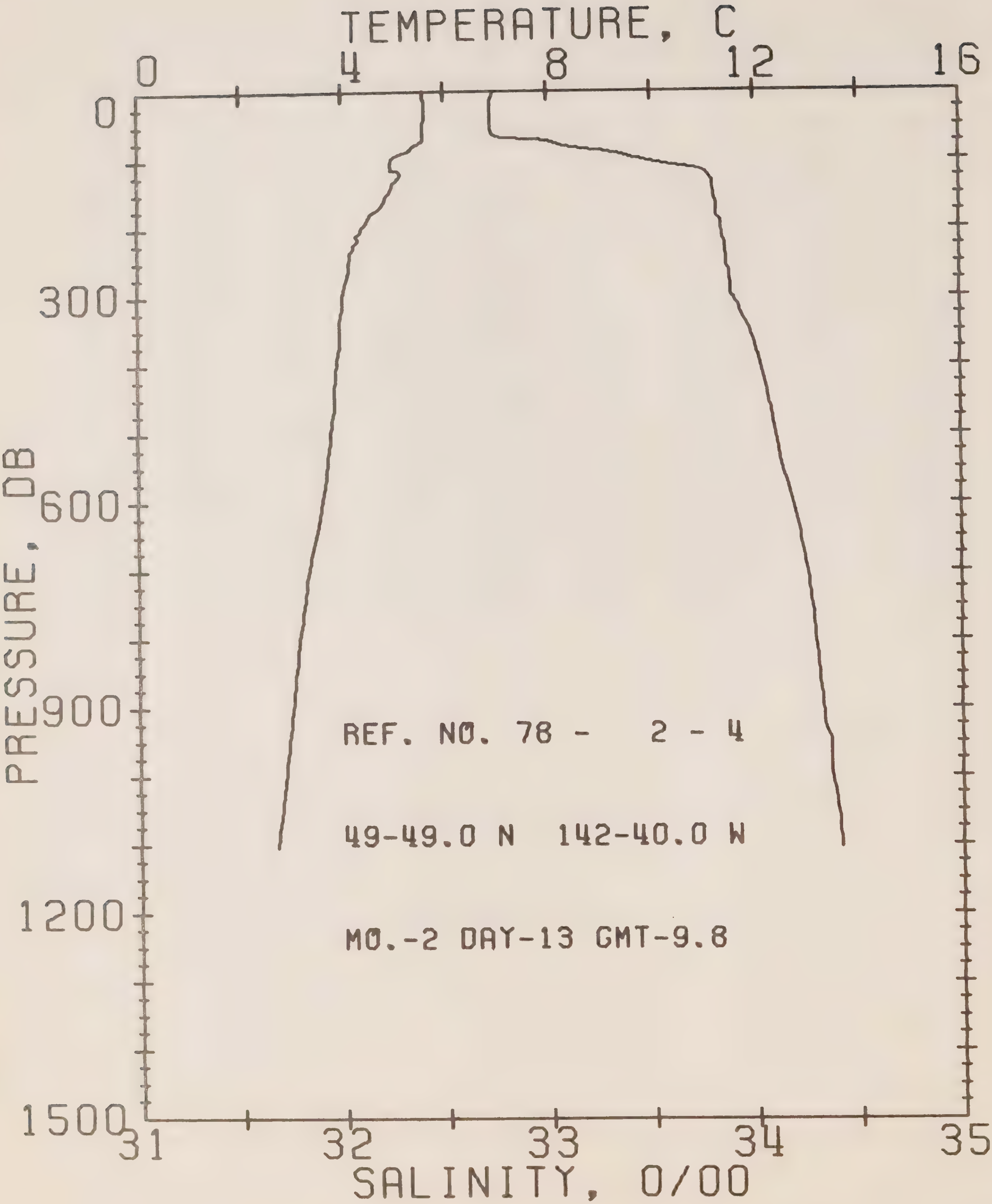
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 1 DATE 11/ 2/78 STATION 5
POSITION 43-51.0N. 128-40.0W GMT 13.8
RESULTS OF STP CAST 265 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	8.16	32.47	0	25.29	269.1	0.0	0.0	1480.
10	8.17	32.47	10	25.29	269.6	0.27	0.01	1480.
20	8.17	32.47	20	25.29	269.7	0.54	0.05	1481.
30	8.16	32.46	30	25.28	270.5	0.81	0.12	1481.
50	8.14	32.47	50	25.30	269.5	1.35	0.34	1481.
75	8.13	32.53	75	25.35	265.2	2.02	0.77	1481.
100	7.33	33.20	99	25.98	205.1	2.62	1.30	1480.
125	7.09	33.51	124	26.26	179.2	3.10	1.85	1479.
150	6.83	33.72	149	26.45	161.1	3.52	2.44	1479.
175	6.57	33.82	174	26.57	149.8	3.91	3.09	1479.
200	6.32	33.87	199	26.64	143.4	4.28	3.79	1478.
225	6.08	33.87	223	26.68	140.7	4.63	4.55	1478.
250	5.80	33.88	248	26.72	136.8	4.98	5.39	1477.
300	5.34	33.88	298	26.77	131.9	5.65	7.28	1476.
400	4.81	33.98	397	26.91	119.6	6.90	11.72	1475.
500	4.55	34.07	496	27.01	110.9	8.05	17.01	1476.
600	4.20	34.15	595	27.11	101.5	9.12	22.96	1476.
800	3.83	34.29	793	27.26	88.7	11.02	36.50	1478.
1000	3.36	34.36	991	27.37	79.7	12.71	51.95	1480.
1200	2.98	34.43	1188	27.46	71.5	14.22	66.87	1481.


TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 2 - 2
49-34.0 N 138-40.0 W
MO.-2 DAY-12 GMT-19.2
31
32
33
34
35
SALINITY, O/OO

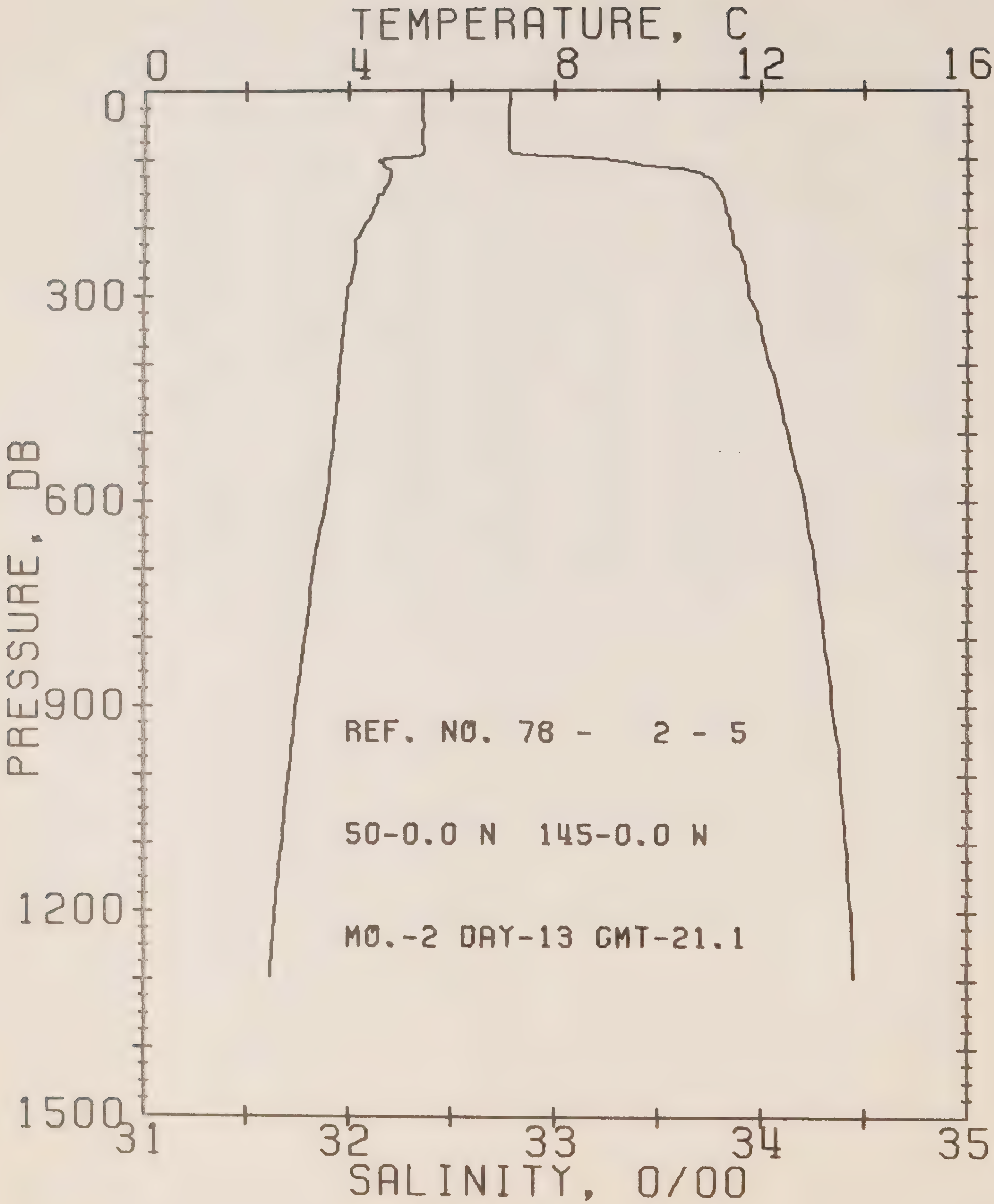
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 2 DATE 12/ 2/78 STATION 10
POSITION 49-34.0N, 138-40.0W GMT 19.2
RESULTS OF STP CAST 185 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	6.72	32.61	0	25.60	239.6	0.0	0.0	1475.
10	6.71	32.61	10	25.60	239.9	0.24	0.01	1475.
20	6.70	32.61	20	25.60	239.8	0.48	0.05	1475.
30	6.71	32.62	30	25.61	239.3	0.72	0.11	1475.
50	6.70	32.62	50	25.61	239.5	1.20	0.31	1475.
75	6.24	33.04	75	26.00	202.8	1.77	0.66	1475.
100	5.63	33.46	99	26.40	164.6	2.23	1.07	1473.
125	5.54	33.73	124	26.63	143.4	2.61	1.51	1474.
150	5.46	33.81	149	26.70	136.8	2.96	2.00	1474.
175	5.14	33.83	174	26.76	131.9	3.29	2.55	1473.
200	4.89	33.86	199	26.81	127.2	3.62	3.17	1472.
225	4.71	33.86	223	26.83	125.4	3.93	3.86	1472.
250	4.52	33.89	248	26.87	121.6	4.24	4.60	1472.
300	4.32	33.92	298	26.92	117.4	4.84	6.28	1472.
400	4.10	34.02	397	27.02	108.3	5.97	10.30	1472.
500	3.87	34.10	496	27.11	101.0	7.01	15.08	1473.
600	3.65	34.18	595	27.19	93.4	7.99	20.55	1474.
800	3.28	34.28	793	27.31	83.2	9.75	33.10	1476.
1000	2.94	34.37	990	27.41	74.4	11.33	47.56	1478.
1200	2.65	34.42	1188	27.48	68.2	12.76	63.50	1480.


TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 2 - 4
49-49.0 N 142-40.0 W
MO.-2 DAY-13 GMT-9.8
31
32
33
34
35
SALINITY, 0/00

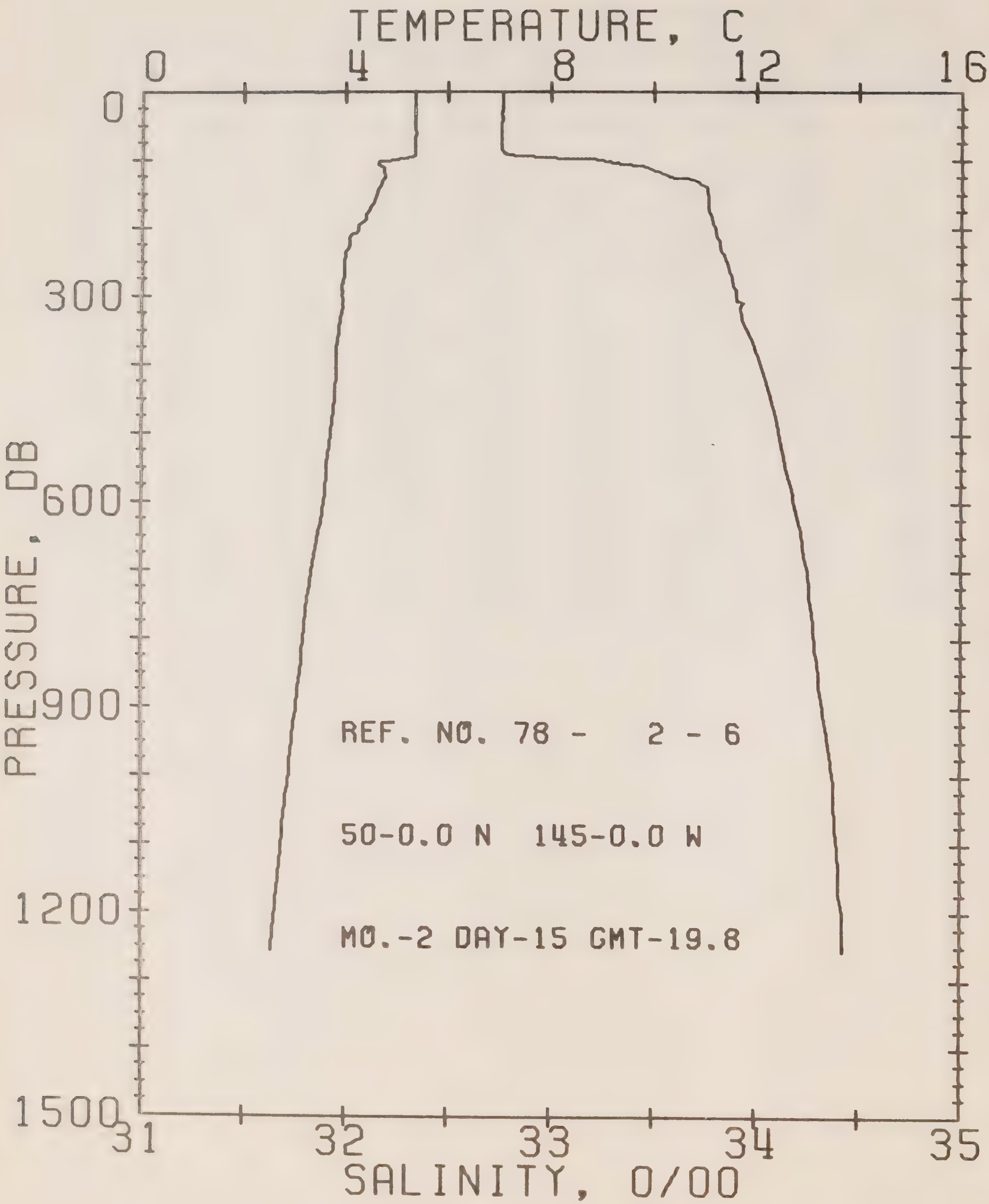
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 4 DATE 13/ 2/78 STATION 12
POSITION 49-49.0N, 142-40.0W GMT 9.8
RESULTS OF STP CAST 169 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.61	32.74	0	25.84	216.8	0.0	0.0	1471.
10	5.61	32.74	10	25.84	217.4	0.22	0.01	1471.
20	5.62	32.73	20	25.83	218.0	0.43	0.04	1471.
30	5.62	32.73	30	25.83	218.1	0.65	0.10	1471.
50	5.60	32.73	50	25.83	218.1	1.09	0.28	1471.
75	5.54	33.03	75	26.08	195.4	1.62	0.62	1472.
100	4.98	33.45	99	26.48	157.6	2.06	1.01	1471.
125	5.15	33.78	124	26.72	134.9	2.42	1.41	1472.
150	4.91	33.81	149	26.77	130.6	2.75	1.88	1471.
175	4.67	33.82	174	26.80	127.5	3.07	2.41	1471.
200	4.39	33.84	199	26.85	123.2	3.39	3.01	1470.
225	4.24	33.86	223	26.88	120.3	3.69	3.67	1470.
250	4.13	33.87	248	26.90	118.6	3.99	4.39	1470.
300	4.00	33.89	298	26.93	116.2	4.58	6.04	1470.
400	3.89	34.03	397	27.05	105.6	5.68	9.96	1472.
500	3.75	34.10	496	27.12	99.3	6.70	14.66	1473.
600	3.60	34.18	595	27.20	92.4	7.67	20.06	1474.
800	3.13	34.29	793	27.33	81.0	9.39	32.27	1475.
1000	2.84	34.36	990	27.42	73.6	10.93	46.43	1477.


TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 2 - 5
50-0.0 N 145-0.0 W
MO.-2 DAY-13 GMT-21.1
31
32
33
34
35
SALINITY, 0/00

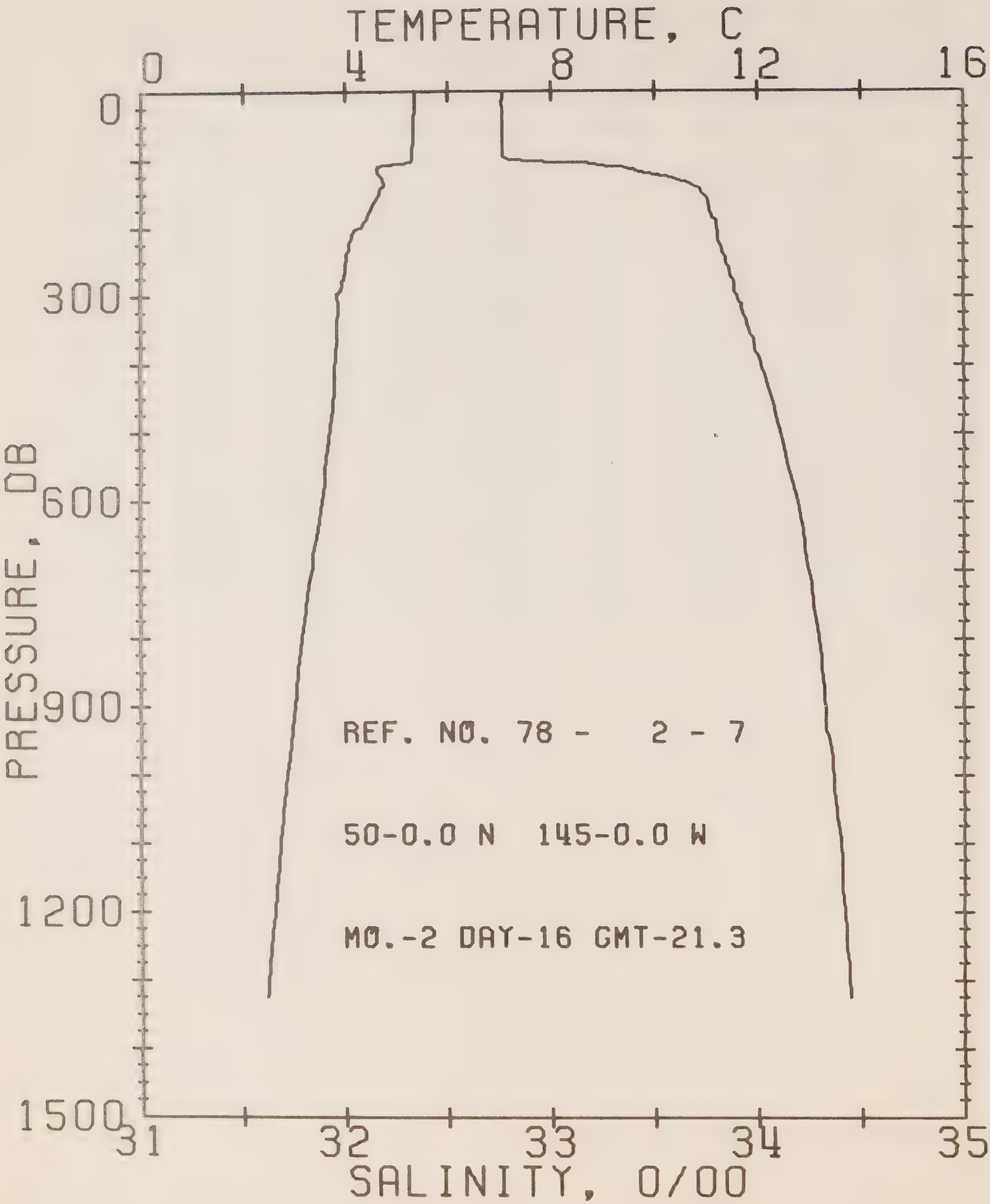
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 5 DATE 13/ 2/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 21.1
RESULTS OF STP CAST 164 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.44	32.79	0	25.90	211.1	0.0	0.0	1470.
10	5.44	32.79	10	25.90	211.4	0.21	0.01	1470.
20	5.44	32.79	20	25.90	211.5	0.42	0.04	1470.
30	5.44	32.78	30	25.89	212.3	0.63	0.10	1470.
50	5.45	32.78	50	25.89	212.8	1.06	0.27	1471.
75	5.45	32.78	75	25.89	213.0	1.59	0.61	1471.
100	4.78	33.22	99	26.31	172.3	2.11	1.07	1469.
125	4.83	33.72	124	26.71	136.1	2.49	1.50	1471.
150	4.68	33.80	149	26.79	128.7	2.82	1.96	1471.
175	4.47	33.83	174	26.83	124.6	3.13	2.48	1470.
200	4.28	33.85	199	26.87	121.3	3.44	3.07	1470.
225	4.13	33.87	223	26.90	118.6	3.74	3.72	1470.
250	4.12	33.91	248	26.93	115.4	4.03	4.42	1470.
300	3.98	33.94	298	26.97	112.3	4.60	6.02	1470.
400	3.83	34.04	397	27.07	104.0	5.67	9.35	1471.
500	3.71	34.13	496	27.15	97.1	6.65	14.45	1473.
600	3.55	34.21	595	27.23	89.8	7.61	19.69	1474.
800	3.15	34.30	793	27.34	80.1	9.30	31.72	1475.
1000	2.83	34.38	990	27.43	72.0	10.82	45.58	1477.
1200	2.57	34.44	1188	27.50	66.3	12.20	61.05	1480.


TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 2 - 6
50-0.0 N 145-0.0 W
MO.-2 DAY-15 GMT-19.8
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 6 DATE 15/ 2/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 19.8
RESULTS OF STP CAST 164 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.37	32.77	0	25.89	211.8	0.0	0.0	1470.
10	5.37	32.77	10	25.89	212.1	0.21	0.01	1470.
20	5.37	32.77	20	25.89	212.2	0.42	0.04	1470.
30	5.37	32.77	30	25.89	212.4	0.64	0.10	1470.
50	5.37	32.76	50	25.88	213.3	1.06	0.27	1470.
75	5.37	32.76	75	25.88	213.6	1.60	0.61	1471.
100	5.05	33.22	99	26.28	175.8	2.12	1.07	1470.
125	4.78	33.60	124	26.62	144.6	2.50	1.52	1470.
150	4.60	33.76	149	26.76	130.8	2.84	1.99	1470.
175	4.46	33.77	174	26.79	128.9	3.16	2.52	1470.
200	4.25	33.80	199	26.83	124.7	3.48	3.13	1470.
225	4.07	33.82	223	26.87	121.4	3.79	3.80	1469.
250	3.93	33.85	248	26.90	118.2	4.09	4.52	1469.
300	3.93	33.90	298	26.94	114.7	4.67	6.15	1470.
400	3.81	34.02	397	27.05	105.3	5.77	10.07	1471.
500	3.71	34.11	496	27.13	98.3	6.78	14.71	1473.
600	3.57	34.18	595	27.20	92.1	7.74	20.05	1474.
800	3.19	34.28	793	27.32	81.9	9.46	32.30	1476.
1000	2.89	34.37	990	27.42	73.3	11.01	46.52	1478.
1200	2.63	34.43	1188	27.48	67.9	12.43	62.37	1480.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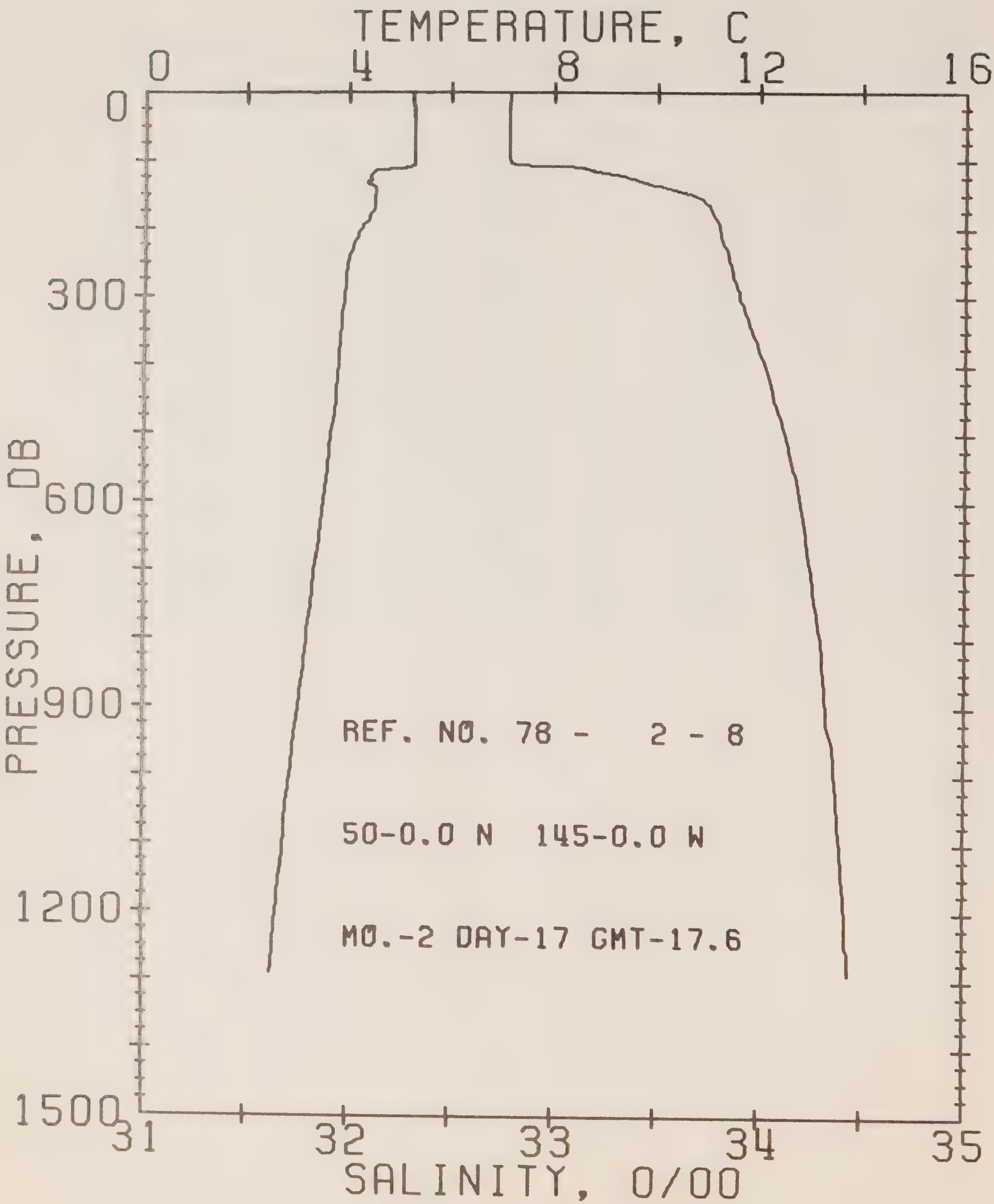
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 2 - 7
50-0.0 N 145-0.0 W
MO.-2 DAY-16 GMT-21.3
31
32
33
34
35
SALINITY, 0/00

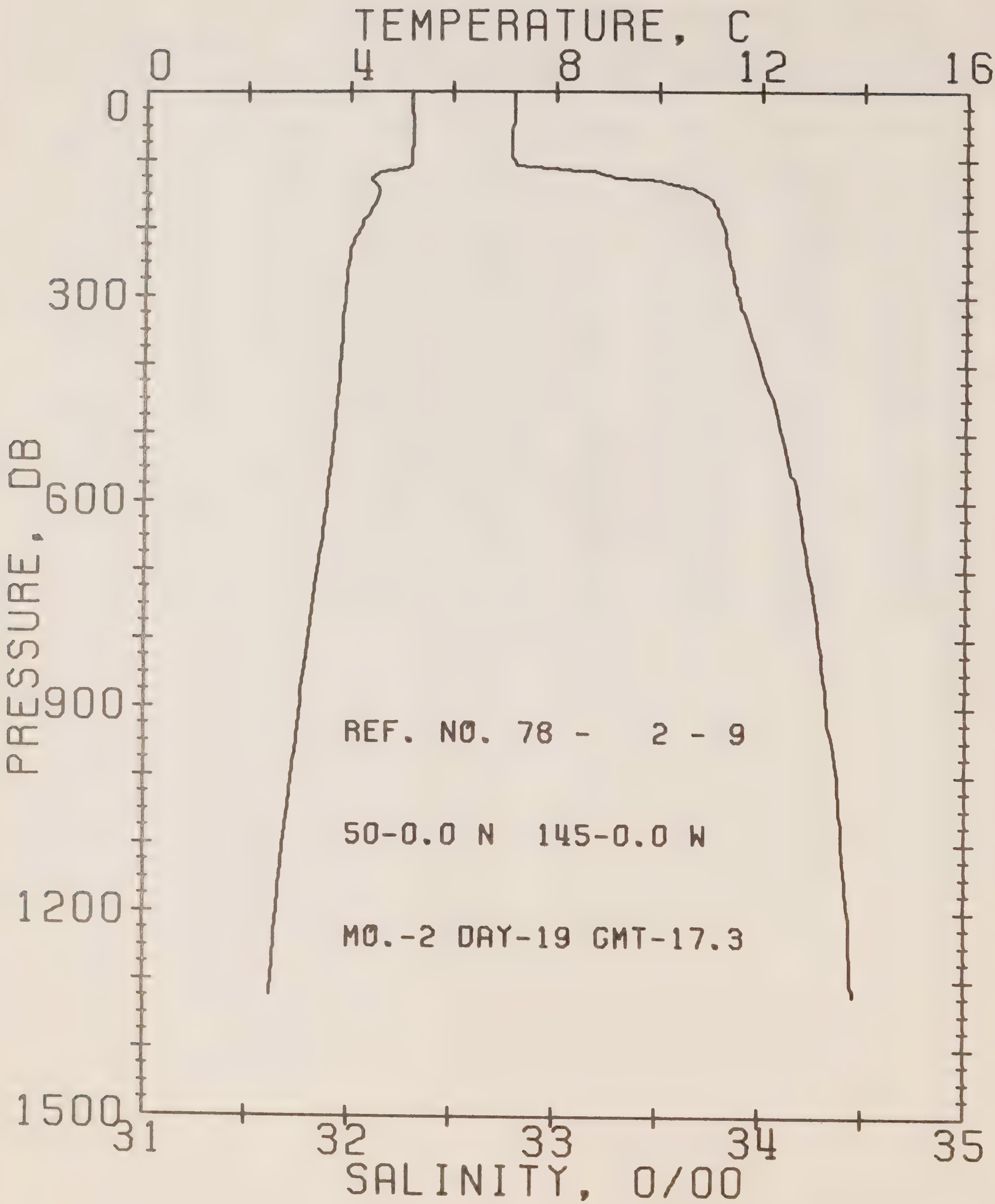
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 7 DATE 16/ 2/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 21.3
RESULTS OF STP CAST 179 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.35	32.77	0	25.89	211.6	0.0	0.0	1469.
10	5.35	32.77	10	25.89	211.9	0.21	0.01	1470.
20	5.35	32.76	20	25.89	212.8	0.42	0.04	1470.
30	5.35	32.77	30	25.89	212.1	0.64	0.10	1470.
50	5.33	32.77	50	25.90	212.2	1.06	0.27	1470.
75	5.33	32.77	75	25.90	212.3	1.59	0.61	1471.
100	5.30	32.80	99	25.92	210.0	2.12	1.08	1471.
125	4.70	33.56	124	26.60	146.4	2.54	1.56	1470.
150	4.65	33.73	149	26.73	133.5	2.89	2.05	1470.
175	4.48	33.77	174	26.78	129.2	3.22	2.59	1470.
200	4.30	33.80	199	26.83	125.2	3.53	3.19	1470.
225	4.09	33.82	223	26.86	121.8	3.84	3.86	1469.
250	4.01	33.85	248	26.90	119.0	4.14	4.59	1469.
300	3.85	33.90	298	26.95	113.9	4.73	6.22	1470.
400	3.80	34.01	397	27.05	105.7	5.82	10.13	1471.
500	3.68	34.11	496	27.13	98.1	6.84	14.79	1472.
600	3.54	34.19	595	27.21	91.3	7.79	20.10	1474.
800	3.15	34.29	793	27.33	80.8	9.50	32.30	1475.
1000	2.86	34.37	990	27.42	73.7	11.05	46.47	1478.
1200	2.61	34.42	1188	27.48	68.1	12.46	62.30	1480.


TEMPERATURE, C
0
4
8
12
16
PRESSURE, DB
0
300
600
900
1200
1500
REF. NO. 78 - 2 - 8
50-0.0 N 145-0.0 W
MO.-2 DAY-17 GMT-17.6
31
32
33
34
35
SALINITY, 0/00

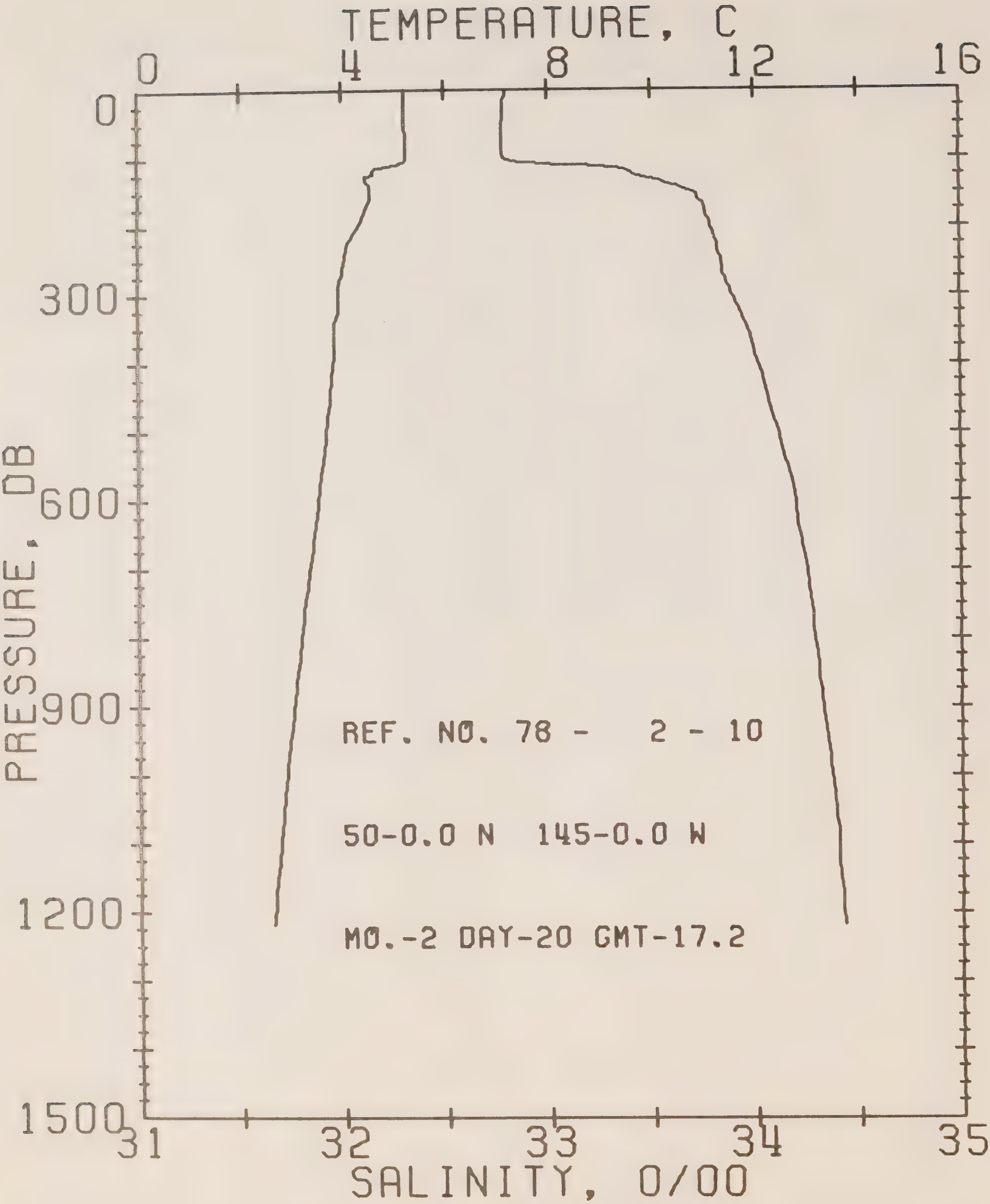
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 8 DATE 17/ 2/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.0
RESULTS OF STP CAST 160 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.25	32.79	0	25.92	209.0	0.0	0.0	1469.
10	5.25	32.79	10	25.92	209.4	0.21	0.01	1469.
20	5.27	32.78	20	25.91	210.4	0.42	0.04	1469.
30	5.27	32.78	30	25.91	210.5	0.63	0.10	1470.
50	5.28	32.78	50	25.91	210.8	1.05	0.27	1470.
75	5.28	32.78	75	25.91	211.0	1.58	0.60	1470.
100	5.28	32.78	99	25.91	211.3	2.11	1.07	1471.
125	4.40	33.37	124	26.47	157.9	2.57	1.60	1468.
150	4.52	33.68	149	26.71	136.1	2.94	2.12	1470.
175	4.47	33.76	174	26.78	129.5	3.27	2.67	1470.
200	4.25	33.80	199	26.83	124.7	3.59	3.27	1470.
225	4.08	33.82	223	26.87	121.4	3.89	3.94	1469.
250	3.98	33.85	248	26.90	118.5	4.19	4.66	1469.
300	3.91	33.90	298	26.95	114.5	4.77	6.29	1470.
400	3.81	34.02	397	27.05	105.0	5.87	10.20	1471.
500	3.67	34.12	496	27.15	97.0	5.88	14.82	1472.
600	3.52	34.20	595	27.22	90.3	7.82	20.06	1474.
800	3.19	34.30	793	27.33	81.0	9.53	32.25	1476.
1000	2.83	34.37	990	27.42	73.5	11.08	46.44	1478.
1200	2.61	34.42	1188	27.49	67.7	12.49	62.26	1480.


TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 2 - 9
50-0.0 N 145-0.0 W
MO.-2 DAY-19 GMT-17.3
31
32
33
34
35
SALINITY, O/OO

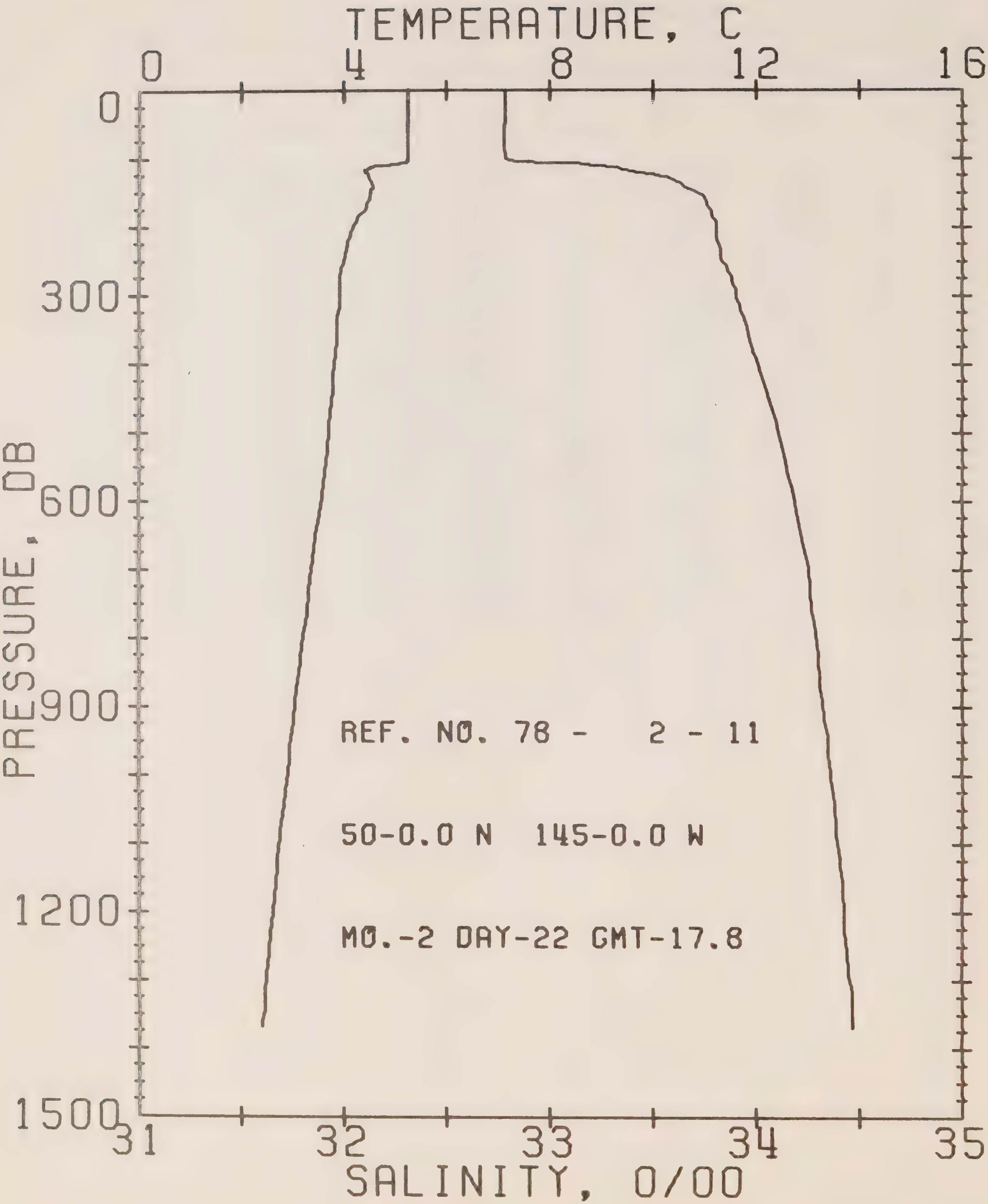
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 9 DATE 19/ 2/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.3
RESULTS OF STP CAST 160 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.19	32.79	0	25.93	208.4	0.0	0.0	1469.
10	5.19	32.80	10	25.94	208.0	0.21	0.01	1469.
20	5.20	32.80	20	25.94	208.1	0.42	0.04	1469.
30	5.21	32.80	30	25.93	208.4	0.62	0.10	1469.
50	5.22	32.80	50	25.93	208.9	1.04	0.27	1470.
75	5.22	32.79	75	25.93	209.7	1.57	0.60	1470.
100	5.21	32.79	99	25.93	209.6	2.09	1.07	1471.
125	4.47	33.28	124	26.40	165.4	2.57	1.61	1469.
150	4.55	33.72	149	26.73	133.5	2.93	2.12	1470.
175	4.40	33.79	174	26.81	126.8	3.25	2.65	1470.
200	4.19	33.82	199	26.85	122.8	3.57	3.25	1469.
225	4.03	33.83	223	26.88	120.4	3.87	3.91	1469.
250	3.97	33.85	248	26.90	118.6	4.17	4.63	1469.
300	3.92	33.89	298	26.94	115.4	4.75	6.27	1470.
400	3.82	34.00	397	27.03	107.2	5.86	10.23	1471.
500	3.71	34.10	496	27.13	99.1	6.89	14.93	1473.
600	3.56	34.19	595	27.21	91.6	7.84	20.27	1474.
800	3.20	34.29	793	27.32	82.0	9.58	32.62	1476.
1000	2.89	34.38	990	27.42	73.1	11.14	46.87	1478.
1200	2.60	34.43	1188	27.49	67.0	12.54	62.58	1480.


TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 2 - 10
50-0.0 N 145-0.0 W
MO.-2 DAY-20 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

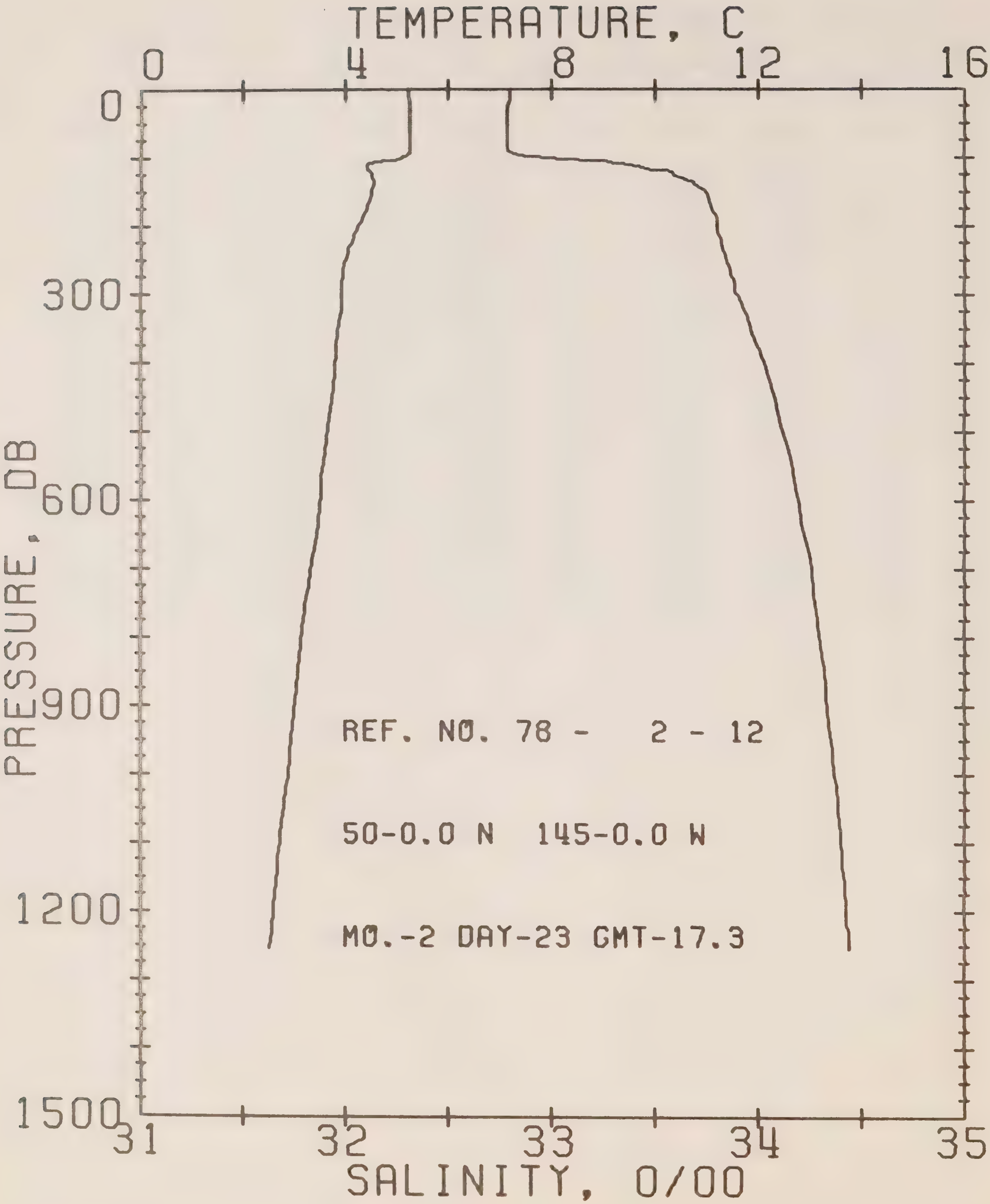
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 10 DATE 20/ 2/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.2
RESULTS OF STP CAST 154 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.22	32.80	0	25.93	207.9	0.0	0.0	1469.
10	5.22	32.80	10	25.93	208.2	0.21	0.01	1469.
20	5.22	32.79	20	25.93	209.1	0.42	0.04	1469.
30	5.23	32.79	30	25.92	209.3	0.63	0.10	1470.
50	5.23	32.78	50	25.92	210.2	1.05	0.27	1470.
75	5.24	32.78	75	25.92	210.7	1.57	0.60	1470.
100	5.24	32.79	99	25.92	210.1	2.10	1.07	1471.
125	4.56	33.42	124	26.50	155.4	2.55	1.58	1469.
150	4.56	33.70	149	26.72	135.2	2.91	2.09	1470.
175	4.46	33.76	174	26.78	129.6	3.24	2.63	1470.
200	4.31	33.79	199	26.82	126.1	3.56	3.24	1470.
225	4.11	33.82	223	26.86	121.9	3.87	3.91	1469.
250	4.03	33.84	248	26.89	119.9	4.17	4.65	1470.
300	3.91	33.89	298	26.94	115.3	4.76	6.30	1470.
400	3.82	34.02	397	27.05	105.8	5.86	10.21	1471.
500	3.69	34.12	496	27.14	97.7	6.88	14.87	1473.
600	3.52	34.20	595	27.22	90.5	7.81	20.13	1474.
800	3.13	34.29	793	27.33	81.6	9.53	32.35	1476.
1000	2.87	34.37	990	27.42	73.4	11.08	46.56	1478.
1200	2.62	34.42	1188	27.48	68.2	12.50	62.37	1480.


TEMPERATURE, C
0
4
8
12
16
PRESSURE, DB
0
300
600
900
1200
1500
REF. NO. 78 - 2 - 11
50-0.0 N 145-0.0 W
MO.-2 DAY-22 GMT-17.8
31
32
33
34
35
SALINITY, 0/00

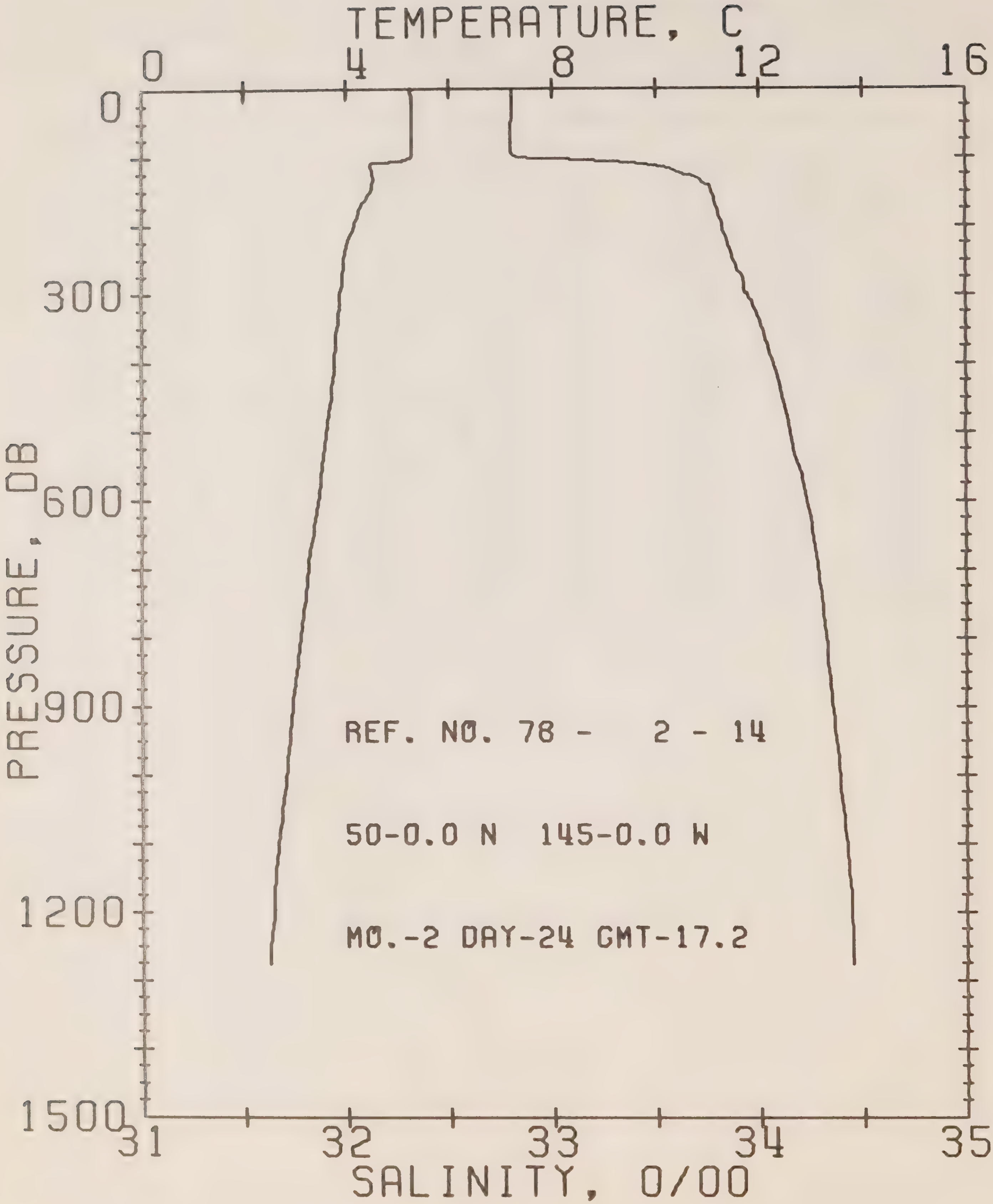
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 11 DATE 22/ 2/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.8
RESULTS OF STP CAST 162 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.24	32.79	0	25.92	208.9	0.0	0.0	1469.
10	5.24	32.79	10	25.92	209.2	0.21	0.01	1469.
20	5.24	32.79	20	25.92	209.3	0.42	0.04	1469.
30	5.24	32.79	30	25.92	209.4	0.63	0.10	1470.
50	5.24	32.79	50	25.92	209.7	1.05	0.27	1470.
75	5.24	32.78	75	25.92	210.6	1.57	0.60	1470.
100	5.24	32.79	99	25.92	210.1	2.10	1.07	1471.
125	4.51	33.55	124	26.61	145.5	2.53	1.56	1469.
150	4.53	33.72	149	26.74	133.5	2.88	2.05	1470.
175	4.41	33.78	174	26.80	127.9	3.21	2.59	1470.
200	4.18	33.81	199	26.85	123.2	3.52	3.19	1469.
225	4.07	33.82	223	26.87	121.6	3.83	3.85	1469.
250	4.00	33.84	248	26.89	119.8	4.13	4.58	1469.
300	3.91	33.90	298	26.95	114.5	4.71	6.21	1470.
400	3.82	34.01	397	27.04	106.4	5.82	10.15	1471.
500	3.71	34.11	496	27.13	98.5	6.84	14.84	1473.
600	3.54	34.18	595	27.21	91.8	7.79	20.16	1474.
800	3.20	34.29	793	27.33	81.6	9.52	32.44	1475.
1000	2.90	34.36	990	27.41	74.5	11.08	46.73	1478.
1200	2.61	34.43	1188	27.49	67.3	12.49	62.55	1480.


TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 2 - 12
50-0.0 N 145-0.0 W
MO.-2 DAY-23 GMT-17.3
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 12 DATE 23/ 2/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.3
RESULTS OF STP CAST 144 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.23	32.81	0	25.94	207.3	0.0	0.0	1469.
10	5.23	32.80	10	25.93	208.4	0.21	0.01	1469.
20	5.24	32.80	20	25.93	208.7	0.42	0.04	1469.
30	5.24	32.79	30	25.92	209.4	0.63	0.10	1470.
50	5.25	32.79	50	25.92	209.7	1.04	0.27	1470.
75	5.26	32.79	75	25.92	210.0	1.57	0.60	1470.
100	5.14	32.94	99	26.06	197.4	2.09	1.07	1470.
125	4.52	33.59	124	26.64	142.6	2.49	1.52	1469.
150	4.52	33.74	149	26.76	131.6	2.83	2.00	1470.
175	4.41	33.77	174	26.79	128.2	3.16	2.53	1470.
200	4.25	33.80	199	26.83	124.7	3.47	3.14	1470.
225	4.10	33.82	223	26.86	121.9	3.78	3.80	1469.
250	3.99	33.85	248	26.89	119.1	4.08	4.53	1469.
300	3.91	33.89	298	26.94	115.0	4.66	6.17	1470.
400	3.79	34.02	397	27.06	104.7	5.76	10.07	1471.
500	3.65	34.12	496	27.14	97.1	6.77	14.69	1472.
600	3.50	34.20	595	27.22	90.5	7.70	19.91	1473.
800	3.14	34.30	793	27.34	80.6	9.40	32.03	1475.
1000	2.87	34.37	990	27.42	73.6	10.94	46.12	1476.
1200	2.58	34.43	1188	27.49	67.0	12.54	61.30	1480.


TEMPERATURE, C
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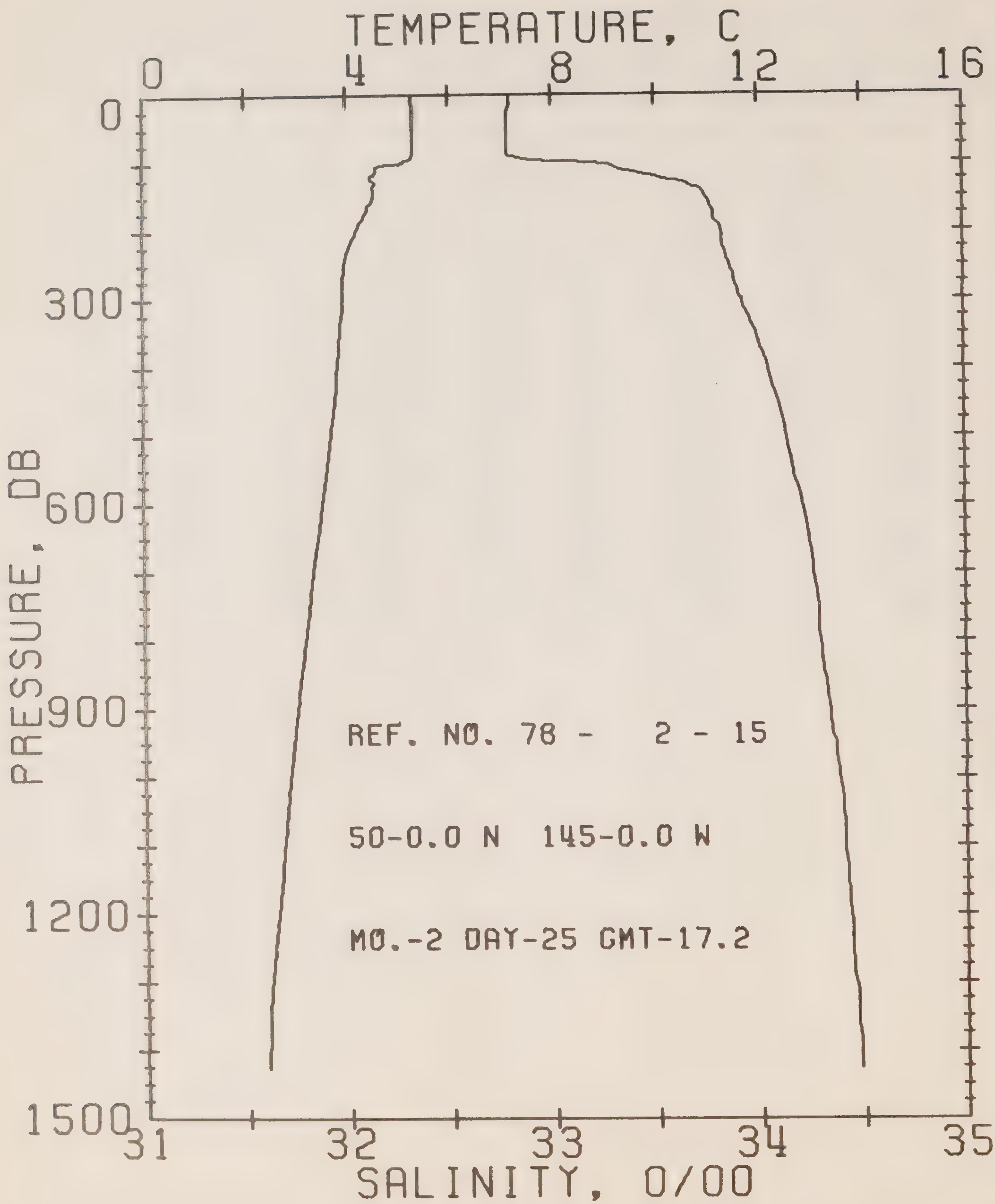
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 2 - 14
50-0.0 N 145-0.0 W
MO.-2 DAY-24 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 14   DATE 24/ 2/78   STATION P
POSITION 50- 0.0N, 145- 0.0W   GMT 17.2
RESULTS OF STP CAST   153 POINTS TAKEN FROM ANALOG TRACE

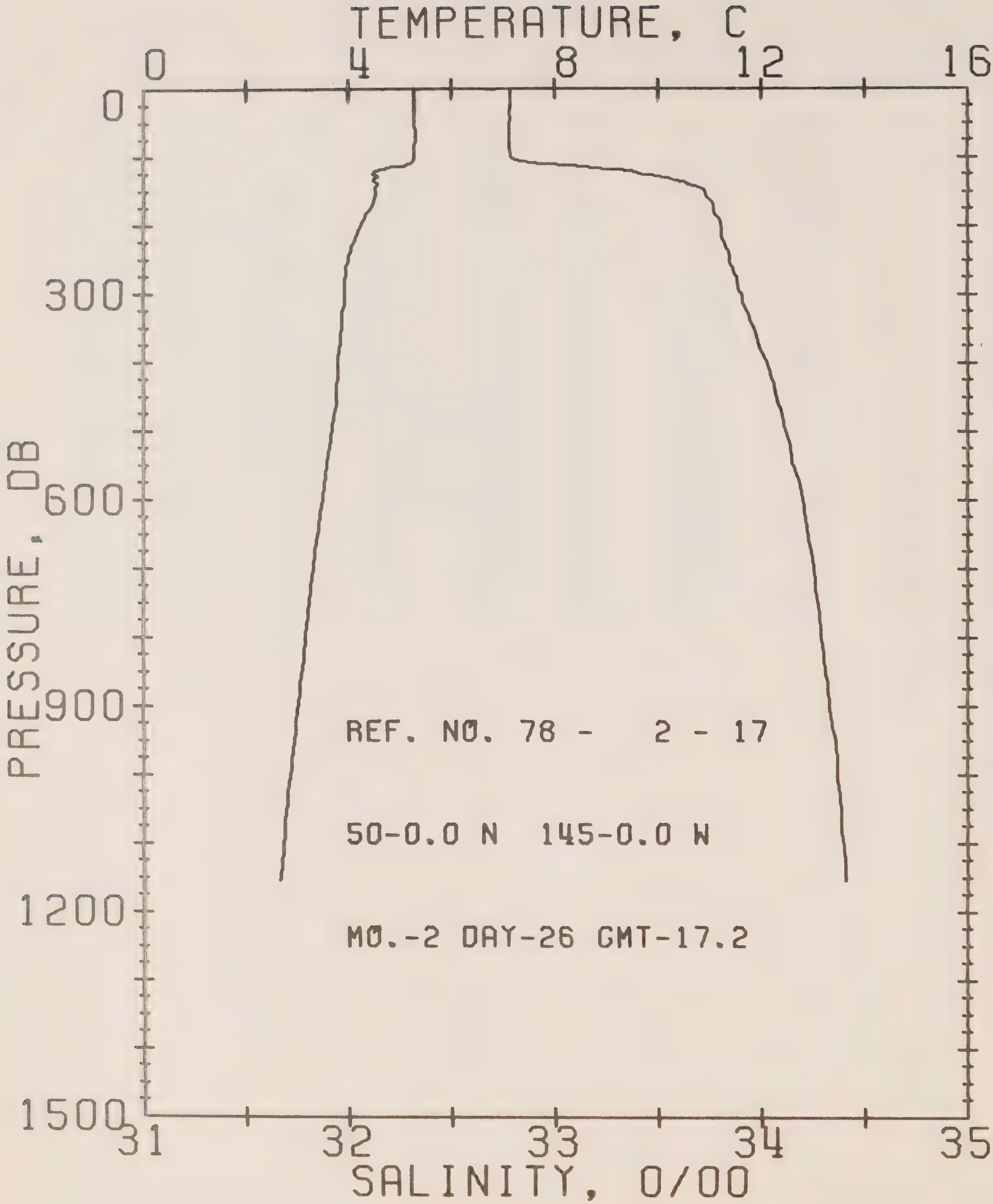
PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.25	32.81	0	25.94	207.6	0.0	0.0	1469.
10	5.27	32.81	10	25.94	208.1	0.21	0.01	1469.
20	5.27	32.81	20	25.94	208.1	0.42	0.04	1470.
30	5.27	32.81	30	25.94	208.2	0.62	0.10	1470.
50	5.28	32.80	50	25.93	209.0	1.04	0.27	1470.
75	5.28	32.80	75	25.93	209.6	1.56	0.60	1470.
100	5.26	32.82	99	25.95	207.8	2.09	1.07	1471.
125	4.52	33.64	124	26.68	138.9	2.49	1.52	1469.
150	4.47	33.77	149	26.78	129.0	2.82	1.98	1470.
175	4.26	33.79	174	26.83	124.9	3.14	2.51	1469.
200	4.15	33.82	199	26.86	122.2	3.44	3.10	1469.
225	4.01	33.85	223	26.89	119.0	3.75	3.75	1469.
250	3.96	33.87	248	26.92	116.8	4.04	4.47	1469.
300	3.88	33.94	298	26.98	111.2	4.61	6.06	1470.
400	3.76	34.06	397	27.09	101.6	5.67	9.83	1471.
500	3.61	34.15	496	27.17	94.5	6.65	14.31	1472.
600	3.44	34.23	595	27.25	87.6	7.56	19.39	1473.
800	3.09	34.32	793	27.36	78.1	9.20	31.11	1475.
1000	2.81	34.39	990	27.44	71.7	10.70	44.83	1477.
1200	2.55	34.44	1188	27.50	66.0	12.07	60.14	1480.



TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 2 - 15
50-0.0 N 145-0.0 W
MO.-2 DAY-25 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 15 DATE 25/ 2/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.2
RESULTS OF STP CAST , 166 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	PCT. EN	SOUND
0	5.28	32.80	0	25.93	208.6	0.0	0.0	1469.
10	5.29	32.80	10	25.93	209.1	0.21	0.01	1469.
20	5.30	32.80	20	25.92	209.6	0.42	0.04	1470.
30	5.30	32.79	30	25.92	210.1	0.63	0.10	1470.
50	5.31	32.79	50	25.92	210.3	1.05	0.27	1470.
75	5.31	32.79	75	25.92	210.6	1.57	0.60	1471.
100	5.12	33.18	99	26.25	179.5	2.09	1.06	1471.
125	4.52	33.57	124	26.62	144.1	2.49	1.52	1469.
150	4.53	33.74	149	26.76	131.4	2.83	1.99	1470.
175	4.35	33.79	174	26.81	126.3	3.15	2.52	1470.
200	4.18	33.82	199	26.85	122.5	3.46	3.12	1469.
225	4.03	33.83	223	26.88	120.3	3.76	3.78	1469.
250	3.95	33.86	248	26.91	117.6	4.06	4.49	1469.
300	3.92	33.92	298	26.96	113.1	4.64	6.11	1470.
400	3.81	34.04	397	27.07	103.4	5.72	9.97	1471.
500	3.67	34.13	496	27.16	96.1	6.72	14.53	1472.
600	3.49	34.21	595	27.23	89.2	7.65	19.74	1473.
800	3.16	34.29	793	27.33	81.0	9.34	31.75	1475.
1000	2.84	34.38	990	27.43	72.4	10.87	45.76	1477.
1200	2.58	34.43	1188	27.50	66.7	12.25	61.27	1480.


TEMPERATURE, C
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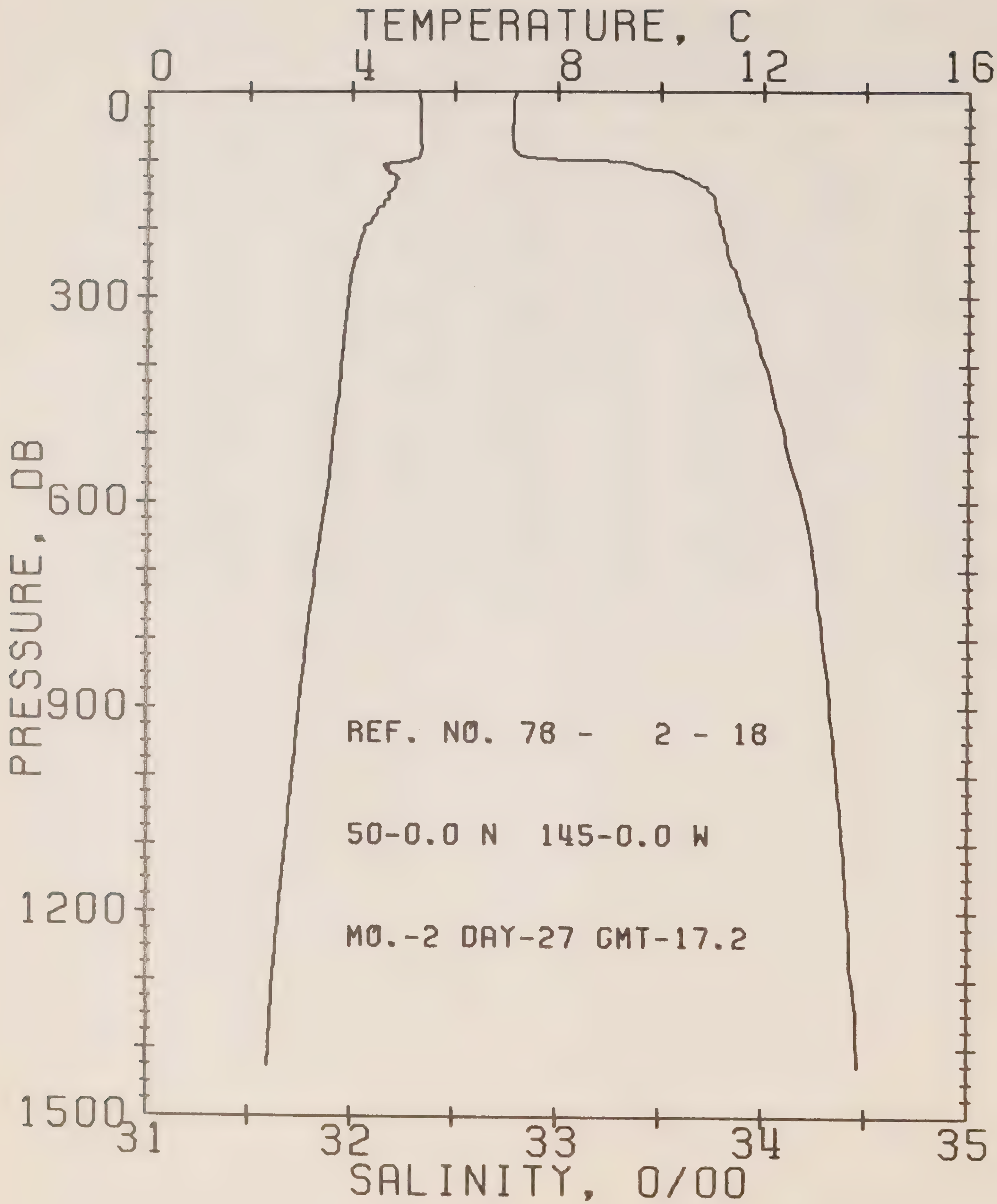
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 2 - 17
50-0.0 N 145-0.0 W
MO.-2 DAY-26 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 17   DATE 26/ 2/78   STATION P
POSITION   50- 0.0N, 145- 0.0W   GMT 17.2
RESULTS OF STP CAST   174 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.28	32.79	0	25.92	209.4	0.0	0.0	1469.
10	5.29	32.79	10	25.92	209.8	0.21	0.01	1469.
20	5.29	32.79	20	25.92	209.9	0.42	0.04	1470.
30	5.28	32.79	30	25.92	209.9	0.63	0.10	1470.
50	5.29	32.78	50	25.91	210.5	1.05	0.27	1470.
75	5.30	32.78	75	25.91	211.2	1.58	0.60	1471.
100	5.27	32.79	99	25.92	210.5	2.11	1.07	1471.
125	4.43	33.43	124	26.51	154.2	2.57	1.60	1469.
150	4.54	33.72	149	26.74	133.1	2.92	2.10	1470.
175	4.43	33.77	174	26.79	128.6	3.25	2.64	1470.
200	4.23	33.80	199	26.83	124.4	3.57	3.24	1469.
225	4.09	33.82	223	26.86	122.0	3.88	3.91	1469.
250	3.99	33.85	248	26.90	118.7	4.18	4.64	1469.
300	3.91	33.90	298	26.95	114.5	4.76	6.27	1470.
400	3.80	34.02	397	27.06	104.8	5.86	10.19	1471.
500	3.68	34.12	496	27.14	97.4	6.87	14.82	1472.
600	3.48	34.20	595	27.23	89.7	7.80	20.05	1473.
800	3.16	34.29	793	27.33	81.2	9.51	32.18	1475.
1000	2.86	34.37	990	27.42	73.4	11.05	46.30	1479.


TEMPERATURE, C
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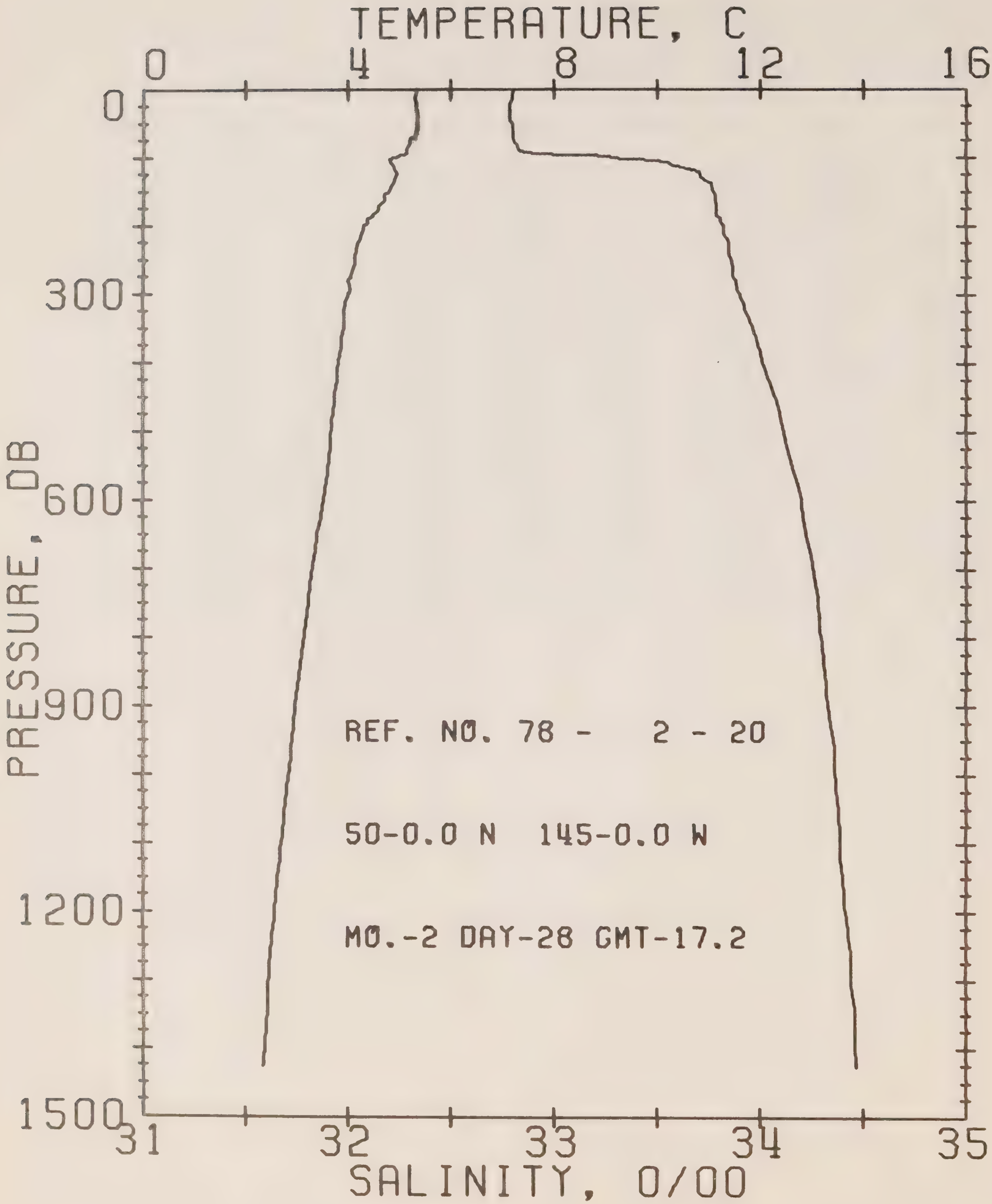
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 2 - 18
50-0.0 N 145-0.0 W
MO.-2 DAY-27 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 18 DATE 27/ 2/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.2
RESULTS OF STP CAST 189 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.32	32.80	0	25.92	209.0	0.0	0.0	1469.
10	5.33	32.79	10	25.92	209.9	0.21	0.01	1470.
20	5.33	32.79	20	25.91	210.3	0.42	0.04	1470.
30	5.33	32.79	30	25.91	210.4	0.63	0.10	1470.
50	5.34	32.79	50	25.91	211.1	1.05	0.27	1470.
75	5.34	32.78	75	25.91	211.6	1.58	0.61	1471.
100	5.21	33.03	99	26.12	191.8	2.10	1.07	1471.
125	4.85	33.62	124	26.62	143.8	2.49	1.51	1471.
150	4.72	33.74	149	26.74	133.5	2.84	2.00	1471.
175	4.49	33.77	174	26.78	129.2	3.16	2.54	1470.
200	4.24	33.80	199	26.83	124.6	3.48	3.15	1470.
225	4.13	33.82	223	26.86	122.2	3.79	3.82	1469.
250	4.04	33.84	248	26.88	120.3	4.09	4.55	1470.
300	3.95	33.90	298	26.94	114.9	4.68	6.19	1470.
400	3.80	34.01	397	27.04	106.1	5.78	10.11	1471.
500	3.65	34.10	495	27.13	98.2	6.80	14.80	1472.
600	3.49	34.19	595	27.22	90.8	7.75	20.11	1473.
800	3.13	34.29	793	27.33	80.8	9.45	32.22	1475.
1000	2.85	34.36	990	27.41	73.8	11.00	46.36	1477.
1200	2.60	34.42	1188	27.48	68.0	12.41	62.22	1480.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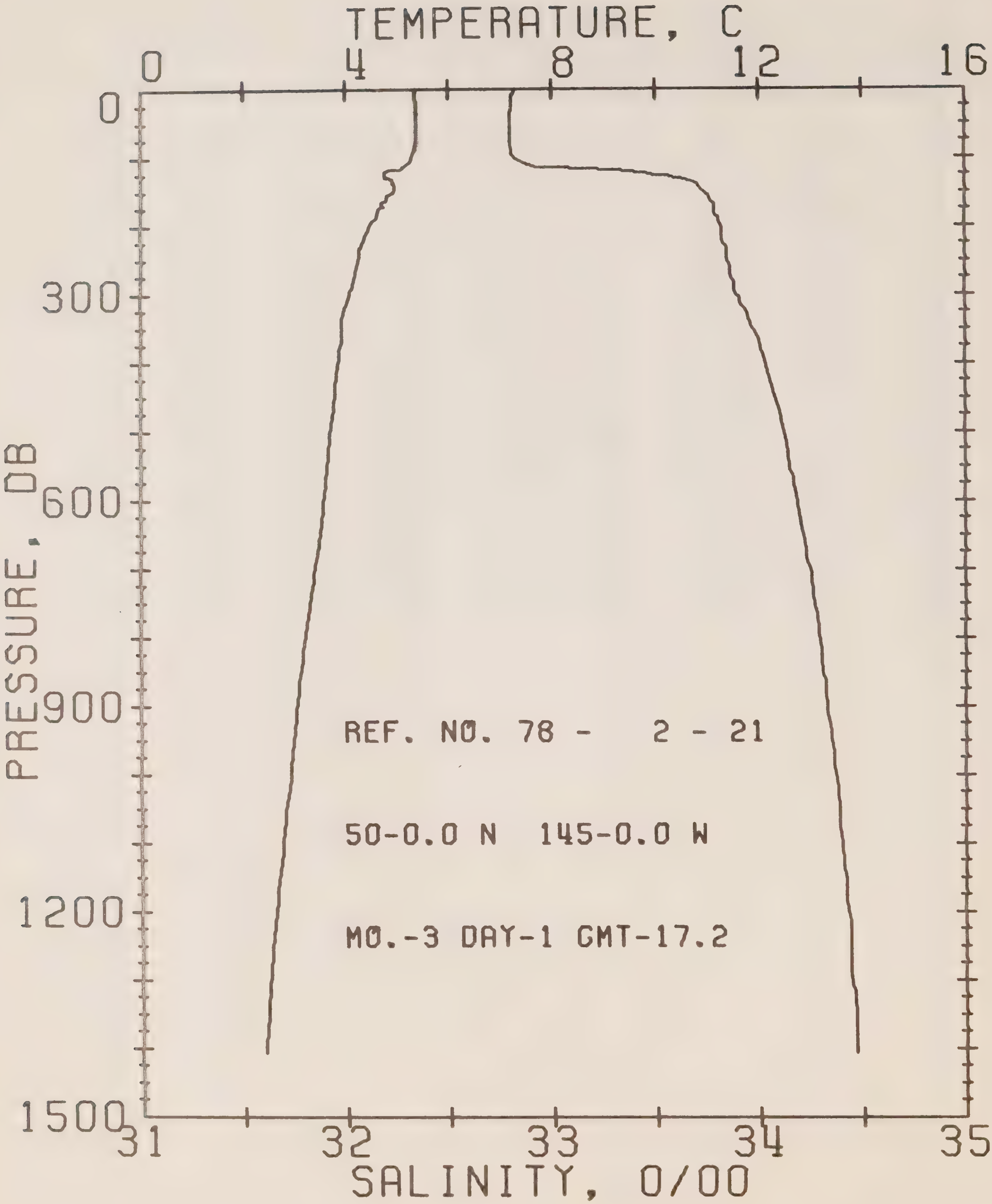
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 2 - 20
50-0.0 N 145-0.0 W
MO.-2 DAY-28 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

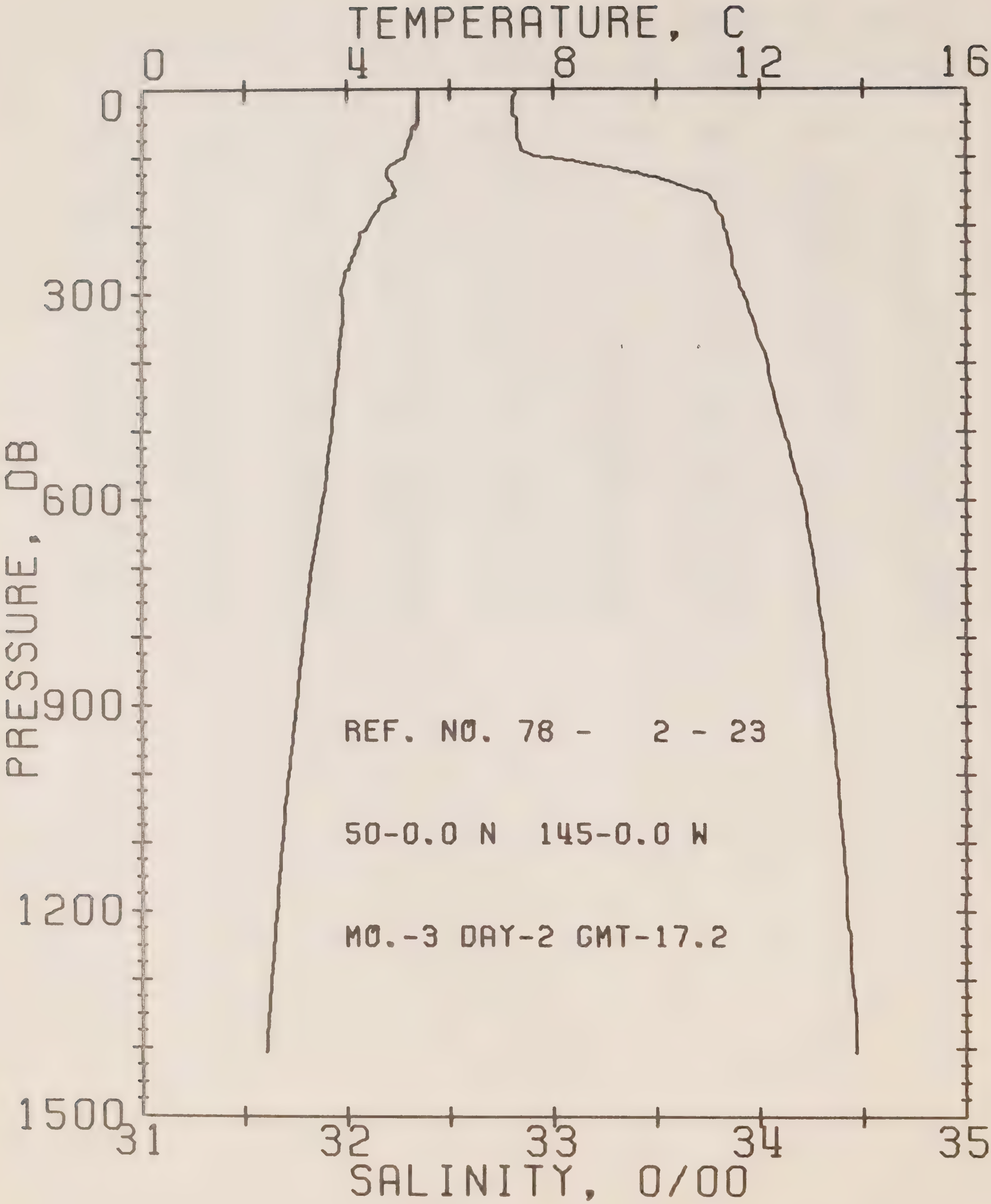
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 20   DATE 23/ 2/78   STATION P
POSITION 50- 0.0N, 145- 0.0W   GMT 17.2
RESULTS OF STP CAST   186 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.33	32.81	0	25.93	208.4	0.0	0.0	1469.
10	5.32	32.80	10	25.92	209.3	0.21	0.01	1470.
20	5.33	32.80	20	25.92	210.0	0.42	0.04	1470.
30	5.35	32.79	30	25.91	210.6	0.63	0.10	1470.
50	5.35	32.80	50	25.92	210.4	1.05	0.27	1470.
75	5.21	32.80	75	25.94	208.4	1.57	0.60	1470.
100	4.94	33.28	99	26.34	170.1	2.08	1.05	1470.
125	4.94	33.71	124	26.68	138.3	2.45	1.47	1471.
150	4.80	33.77	149	26.75	132.3	2.79	1.94	1471.
175	4.59	33.79	174	26.79	128.8	3.11	2.48	1471.
200	4.33	33.82	199	26.84	124.0	3.43	3.09	1470.
225	4.19	33.85	223	26.88	120.6	3.73	3.75	1470.
250	4.12	33.86	248	26.89	119.5	4.03	4.48	1470.
300	4.01	33.90	298	26.94	115.5	4.62	6.13	1470.
400	3.82	34.01	397	27.04	106.0	5.72	10.06	1471.
500	3.67	34.11	496	27.14	97.9	6.74	14.70	1472.
600	3.51	34.20	595	27.22	90.3	7.68	19.98	1474.
800	3.14	34.29	793	27.33	80.7	9.38	32.07	1475.
1000	2.84	34.36	990	27.42	73.6	10.92	46.15	1477.
1200	2.56	34.41	1188	27.48	68.0	12.33	61.99	1480.


TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 2 - 21
50-0.0 N 145-0.0 W
MO.-3 DAY-1 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

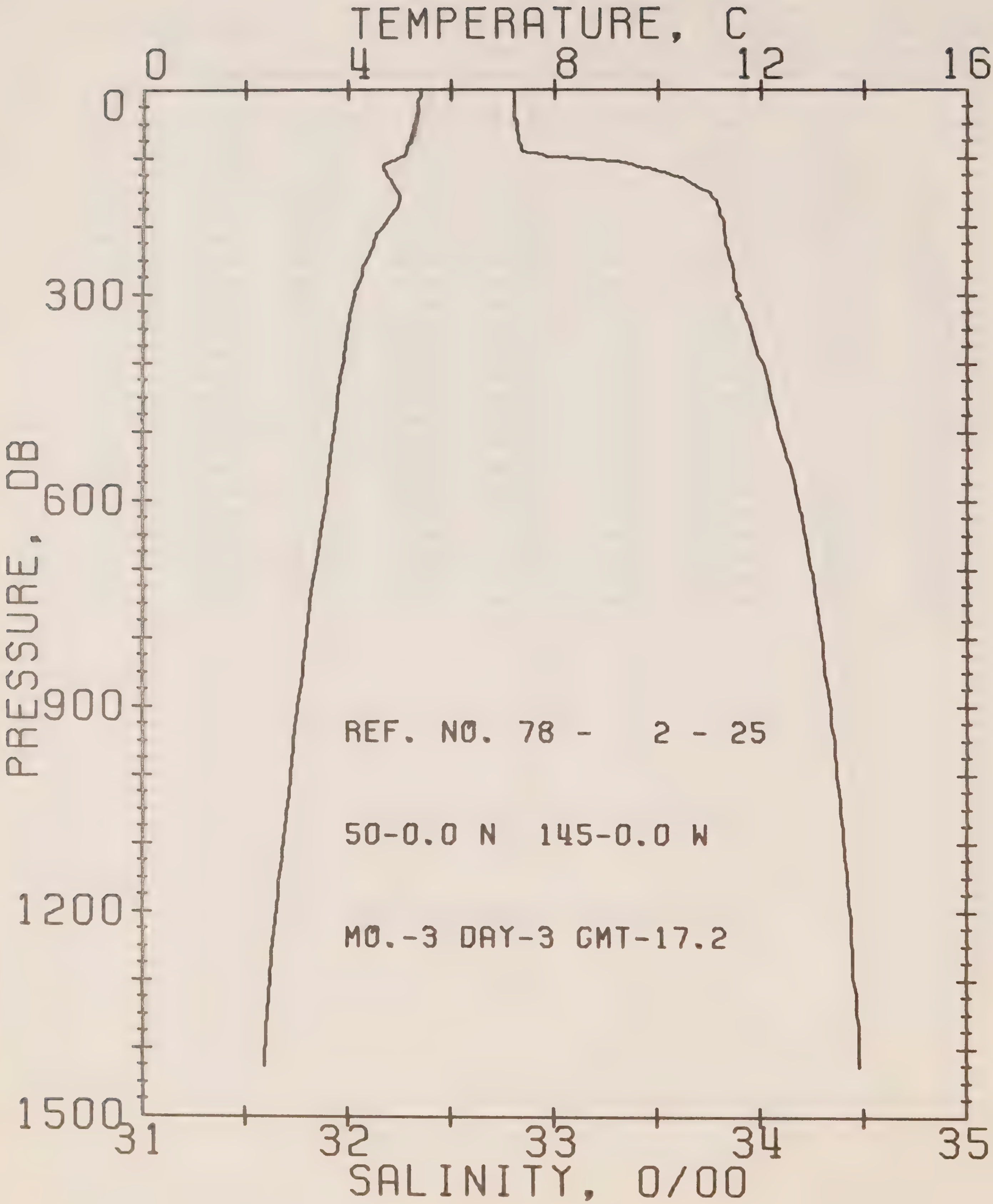
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 21 DATE 1/ 3/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.2
RESULTS OF STP CAST 188 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.37	32.82	0	25.93	208.1	0.0	0.0	1470.
10	5.37	32.81	10	25.93	209.0	0.21	0.01	1470.
20	5.38	32.81	20	25.92	209.3	0.42	0.04	1470.
30	5.39	32.81	30	25.92	209.6	0.63	0.10	1470.
50	5.39	32.80	50	25.91	210.4	1.05	0.27	1470.
75	5.38	32.80	75	25.91	210.7	1.57	0.60	1471.
100	5.29	32.82	99	25.94	208.2	2.10	1.07	1471.
125	4.77	33.50	124	26.54	152.0	2.57	1.61	1470.
150	4.95	33.73	149	26.70	136.8	2.92	2.10	1472.
175	4.66	33.79	174	26.78	129.5	3.26	2.65	1471.
200	4.47	33.82	199	26.82	125.8	3.58	3.26	1470.
225	4.32	33.83	223	26.85	123.4	3.89	3.94	1470.
250	4.24	33.85	248	26.87	121.3	4.19	4.68	1470.
300	4.08	33.89	298	26.92	117.0	4.79	6.35	1471.
400	3.84	34.03	397	27.05	105.1	5.89	10.26	1471.
500	3.70	34.12	496	27.14	97.3	6.90	14.89	1473.
600	3.56	34.19	595	27.21	91.7	7.85	20.19	1474.
800	3.20	34.29	793	27.33	81.5	9.58	32.52	1476.
1000	2.91	34.37	990	27.42	73.8	11.13	46.74	1478.
1200	2.62	34.43	1188	27.49	67.4	12.54	62.53	1480.


TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 2 - 23
50-0.0 N 145-0.0 W
MO.-3 DAY-2 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

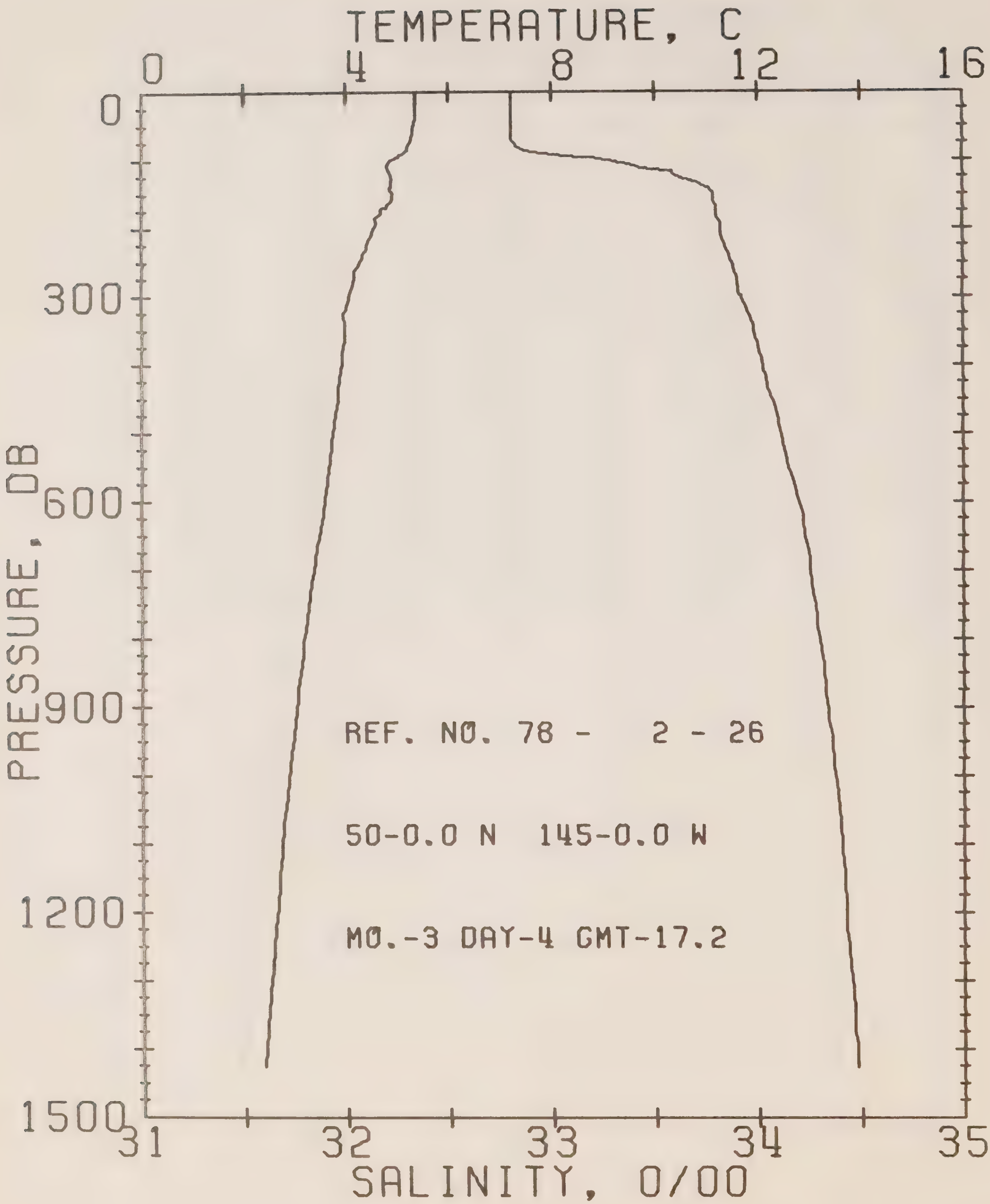
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 23   DATE 2/ 3/78   STATION P
POSITION 50- 0.0N, 145- 0.0W   GMT 17.2
RESULTS OF STP CAST   184 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	FCT. EN	SOUND
0	5.39	32.81	0	25.92	209.1	0.0	0.0	1470.
10	5.39	32.82	10	25.93	209.0	0.21	0.01	1470.
20	5.39	32.81	20	25.92	209.5	0.42	0.04	1470.
30	5.40	32.81	30	25.92	209.7	0.63	0.10	1470.
50	5.30	32.83	50	25.94	208.0	1.05	0.27	1470.
75	5.21	32.83	75	25.96	206.4	1.56	0.60	1470.
100	5.11	32.97	99	26.08	195.1	2.07	1.05	1470.
125	4.78	33.43	124	26.48	157.4	2.51	1.55	1470.
150	4.94	33.71	149	26.68	138.4	2.88	2.06	1472.
175	4.62	33.79	174	26.78	129.2	3.21	2.61	1471.
200	4.41	33.83	199	26.84	124.3	3.53	3.22	1470.
225	4.22	33.85	223	26.87	120.9	3.83	3.88	1470.
250	4.10	33.87	248	26.90	118.3	4.13	4.60	1470.
300	3.88	33.92	298	26.96	112.7	4.71	6.22	1470.
400	3.83	34.04	397	27.06	104.4	5.80	10.10	1471.
500	3.69	34.12	496	27.14	97.5	6.81	14.74	1473.
600	3.53	34.21	595	27.23	89.7	7.75	19.98	1474.
800	3.15	34.31	793	27.35	79.7	9.43	31.98	1475.
1000	2.86	34.37	990	27.42	73.0	10.96	45.99	1478.
1200	2.63	34.42	1188	27.48	68.2	12.37	61.71	1480.


TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 2 - 25
50-0.0 N 145-0.0 W
MO.-3 DAY-3 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

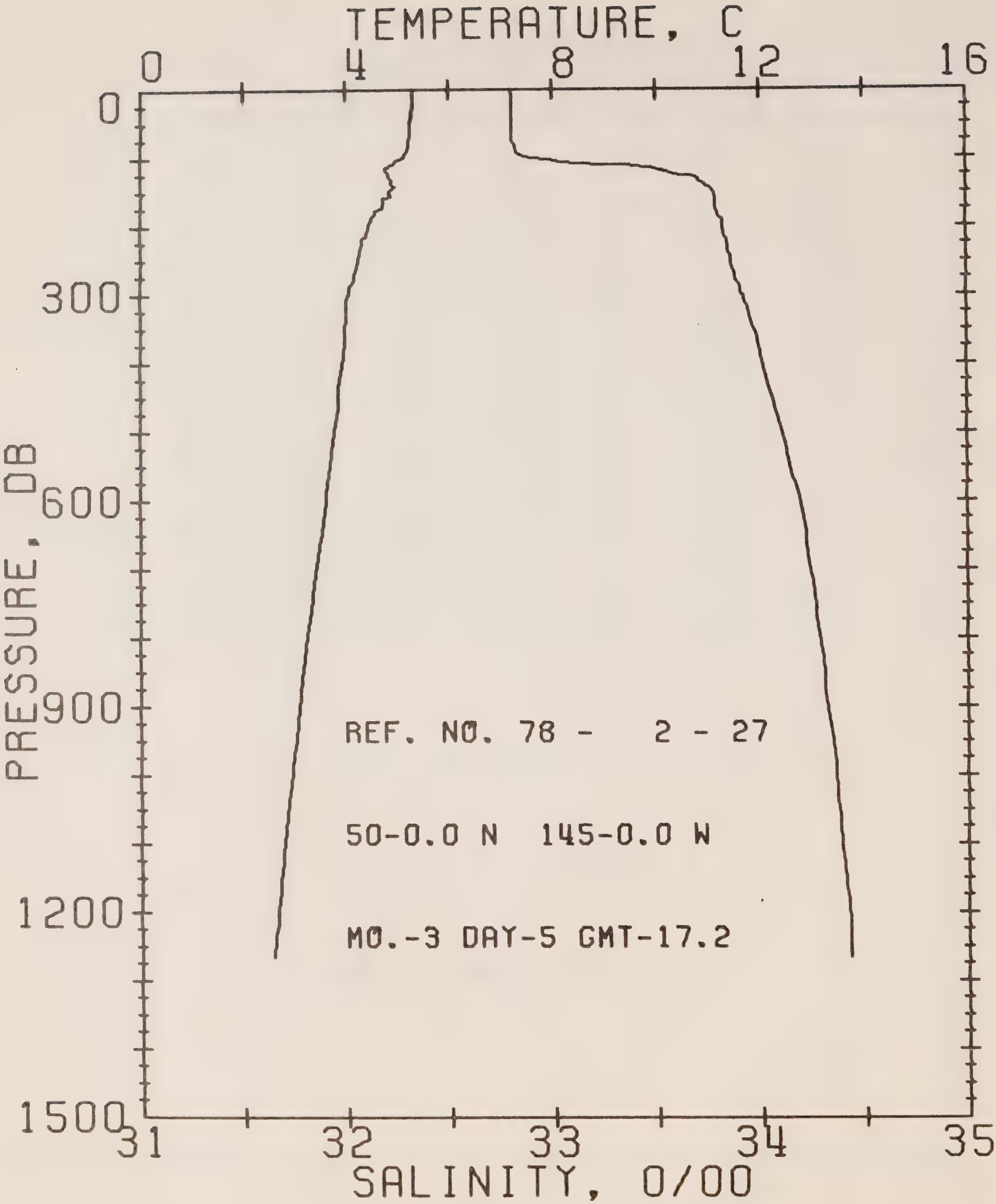
OFF SHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 25 DATE 3/ 3/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.2
RESULTS OF STP CAST 136 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.42	32.81	0	25.92	209.4	0.0	0.0	1470.
10	5.42	32.81	10	25.92	209.7	0.21	0.01	1470.
20	5.35	32.81	20	25.93	209.1	0.42	0.04	1470.
30	5.35	32.81	30	25.93	209.2	0.63	0.10	1470.
50	5.30	32.82	50	25.94	208.0	1.05	0.27	1470.
75	5.20	32.83	75	25.96	206.4	1.56	0.60	1470.
100	5.03	33.06	99	26.16	187.3	2.07	1.05	1470.
125	4.77	33.58	124	26.60	146.0	2.47	1.50	1470.
150	4.97	33.74	149	26.71	136.3	2.82	2.00	1472.
175	4.93	33.80	174	26.76	131.8	3.16	2.55	1472.
200	4.68	33.82	199	26.80	127.8	3.48	3.17	1471.
225	4.49	33.83	223	26.83	125.2	3.80	3.85	1471.
250	4.35	33.85	248	26.86	122.2	4.11	4.60	1471.
300	4.12	33.90	298	26.92	115.7	4.71	6.28	1471.
400	3.90	34.01	397	27.03	107.2	5.83	10.28	1472.
500	3.72	34.09	495	27.11	100.2	6.86	15.02	1473.
600	3.57	34.18	595	27.20	92.3	7.82	20.38	1474.
800	3.19	34.30	793	27.33	81.1	9.55	32.66	1476.
1000	2.89	34.37	990	27.42	73.7	11.09	46.80	1478.
1200	2.60	34.43	1188	27.49	66.8	12.49	62.51	1480.


TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 2 - 26
50-0.0 N 145-0.0 W
MO.-3 DAY-4 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

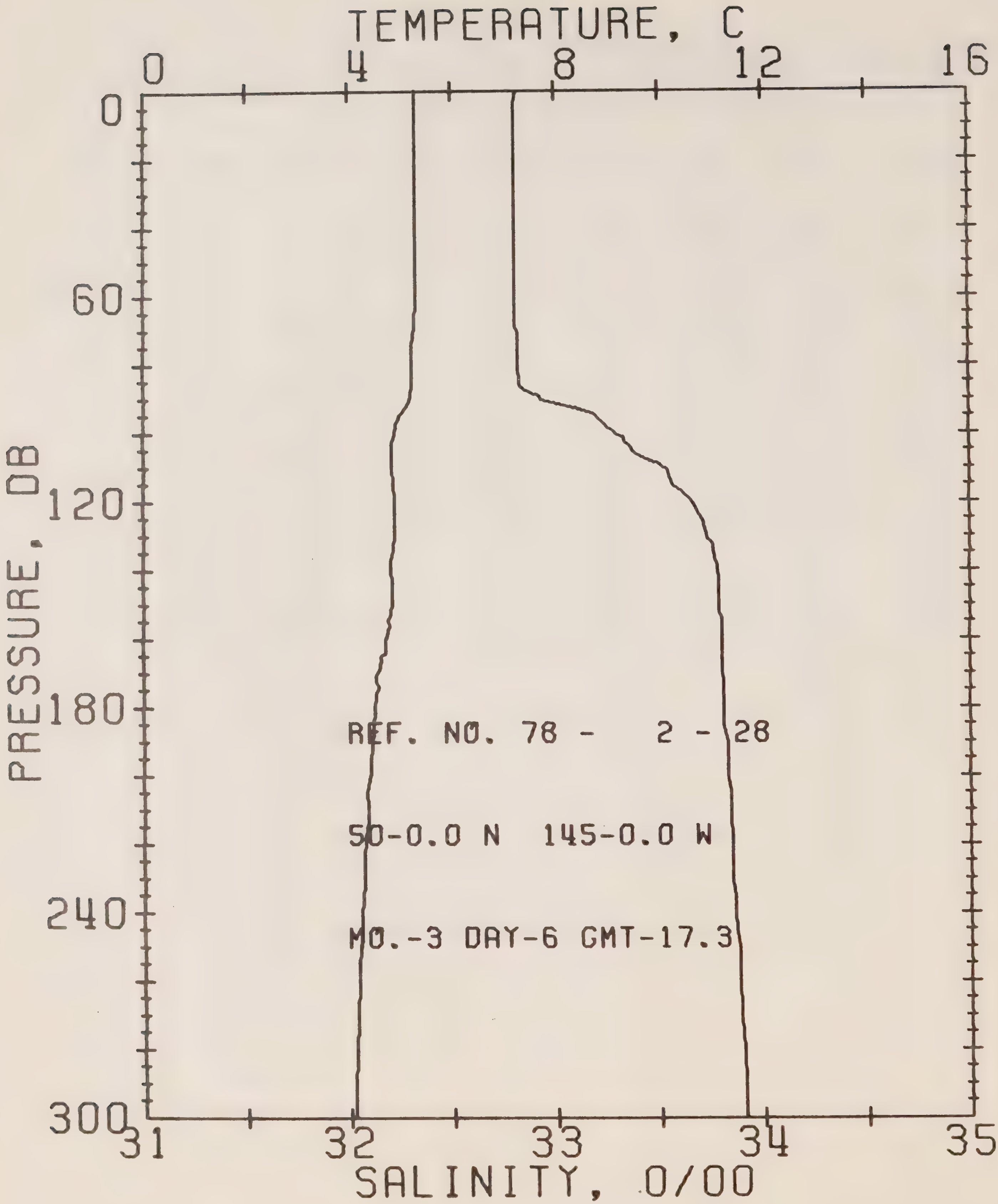
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 26 DATE 4/ 3/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.2
RESULTS OF STD CAST 186 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.37	32.81	0	25.92	208.8	0.0	0.0	1470.
10	5.37	32.81	10	25.92	209.1	0.21	0.01	1470.
20	5.37	32.81	20	25.92	209.2	0.42	0.04	1470.
30	5.35	32.81	30	25.93	209.2	0.63	0.10	1470.
50	5.32	32.81	50	25.93	209.1	1.05	0.27	1470.
75	5.24	32.82	75	25.95	207.8	1.57	0.60	1470.
100	4.90	33.27	99	26.34	170.4	2.06	1.04	1470.
125	4.90	33.62	124	26.62	144.2	2.45	1.48	1471.
150	4.92	33.73	149	26.75	132.5	2.79	1.95	1471.
175	4.63	33.80	174	26.78	129.1	3.12	2.50	1471.
200	4.55	33.82	199	26.82	126.3	3.44	3.11	1471.
225	4.40	33.84	223	26.85	123.6	3.75	3.79	1471.
250	4.25	33.87	248	26.89	119.8	4.05	4.52	1470.
300	4.04	33.92	298	26.95	114.4	4.64	6.16	1470.
400	3.91	34.02	397	27.04	106.0	5.74	10.07	1472.
500	3.74	34.11	496	27.13	98.7	6.76	14.75	1473.
600	3.57	34.20	595	27.22	90.5	7.71	20.07	1474.
800	3.17	34.30	793	27.33	80.7	9.42	32.22	1475.
1000	2.87	34.38	990	27.42	73.0	10.95	46.22	1478.
1200	2.65	34.43	1188	27.49	67.5	12.35	61.91	1480.


TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 2 - 27
50-0.0 N 145-0.0 W
MO.-3 DAY-5 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

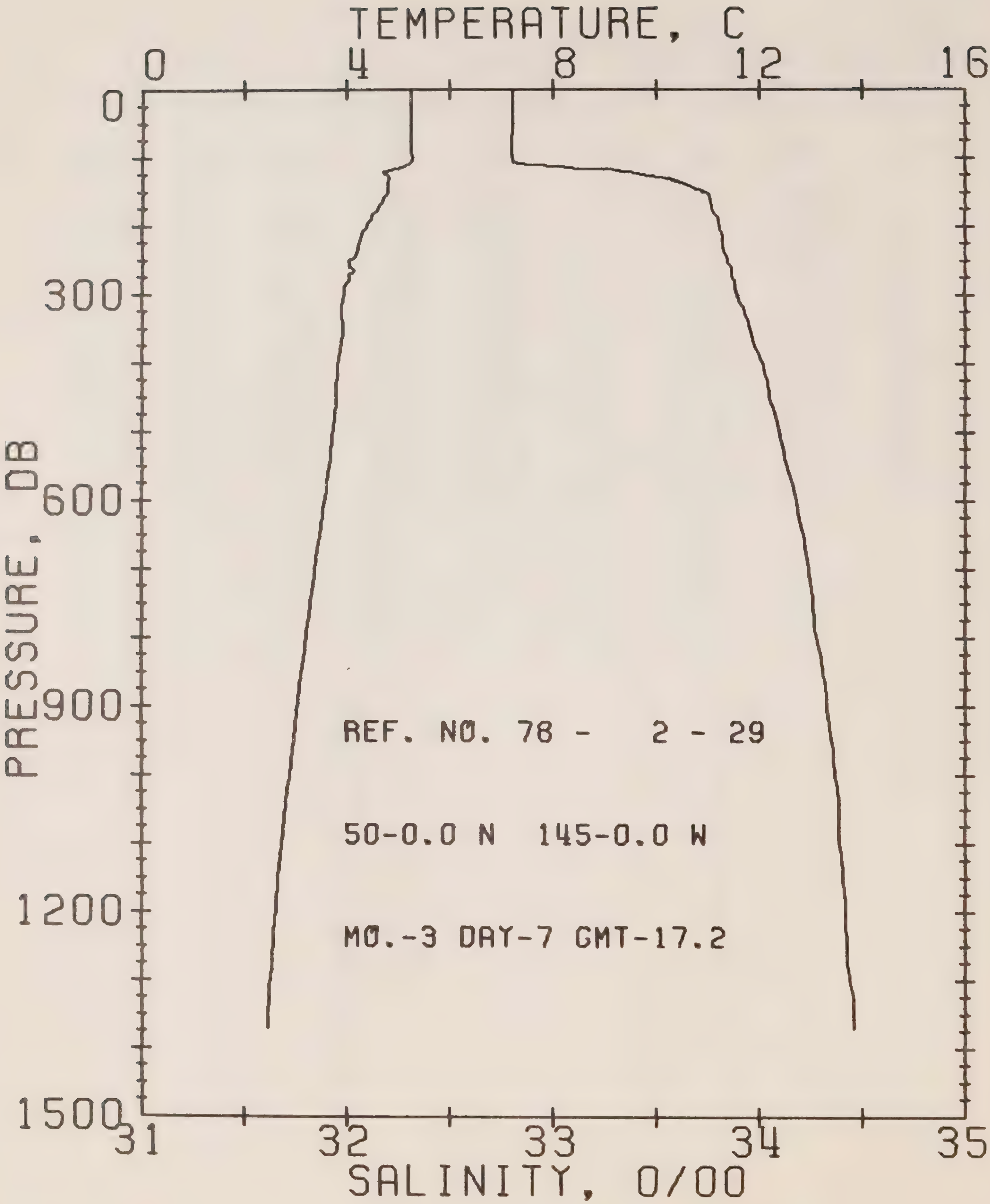
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 27 DATE 5/ 3/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.2
RESULTS OF STP CAST 174 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.30	32.81	0	25.93	208.1	0.0	0.0	1469.
10	5.30	32.81	10	25.93	208.4	0.21	0.01	1469.
20	5.31	32.81	20	25.93	208.6	0.42	0.04	1470.
30	5.29	32.81	30	25.93	208.5	0.63	0.10	1470.
50	5.25	32.81	50	25.94	208.3	1.04	0.27	1470.
75	5.23	32.81	75	25.94	208.2	1.56	0.60	1470.
100	5.11	32.90	99	26.02	200.4	2.08	1.06	1470.
125	4.84	33.62	124	26.62	143.7	2.50	1.53	1471.
150	4.86	33.77	149	26.75	132.6	2.84	2.01	1471.
175	4.67	33.79	174	26.78	129.6	3.17	2.56	1471.
200	4.44	33.82	199	26.83	125.3	3.49	3.16	1470.
225	4.31	33.84	223	26.86	122.4	3.80	3.83	1470.
250	4.23	33.86	248	26.88	120.5	4.10	4.57	1470.
300	4.04	33.91	298	26.94	115.1	4.69	6.22	1470.
400	3.92	34.01	397	27.03	107.4	5.79	10.15	1472.
500	3.75	34.10	496	27.12	99.4	6.83	14.89	1473.
600	3.59	34.19	595	27.21	91.7	7.78	20.24	1474.
800	3.22	34.28	793	27.32	82.4	9.52	32.62	1476.
1000	2.93	34.36	990	27.41	74.7	11.09	46.93	1478.
1200	2.64	34.42	1188	27.48	66.2	12.52	63.00	1480.


TEMPERATURE, C
0
4
8
12
16
PRESSURE, DB
0
60
120
180
240
300
REF. NO. 78 - 2 - 28
50-0.0 N 145-0.0 W
MO.-3 DAY-6 GMT-17.3
31
32
33
34
35
SALINITY, 0/00

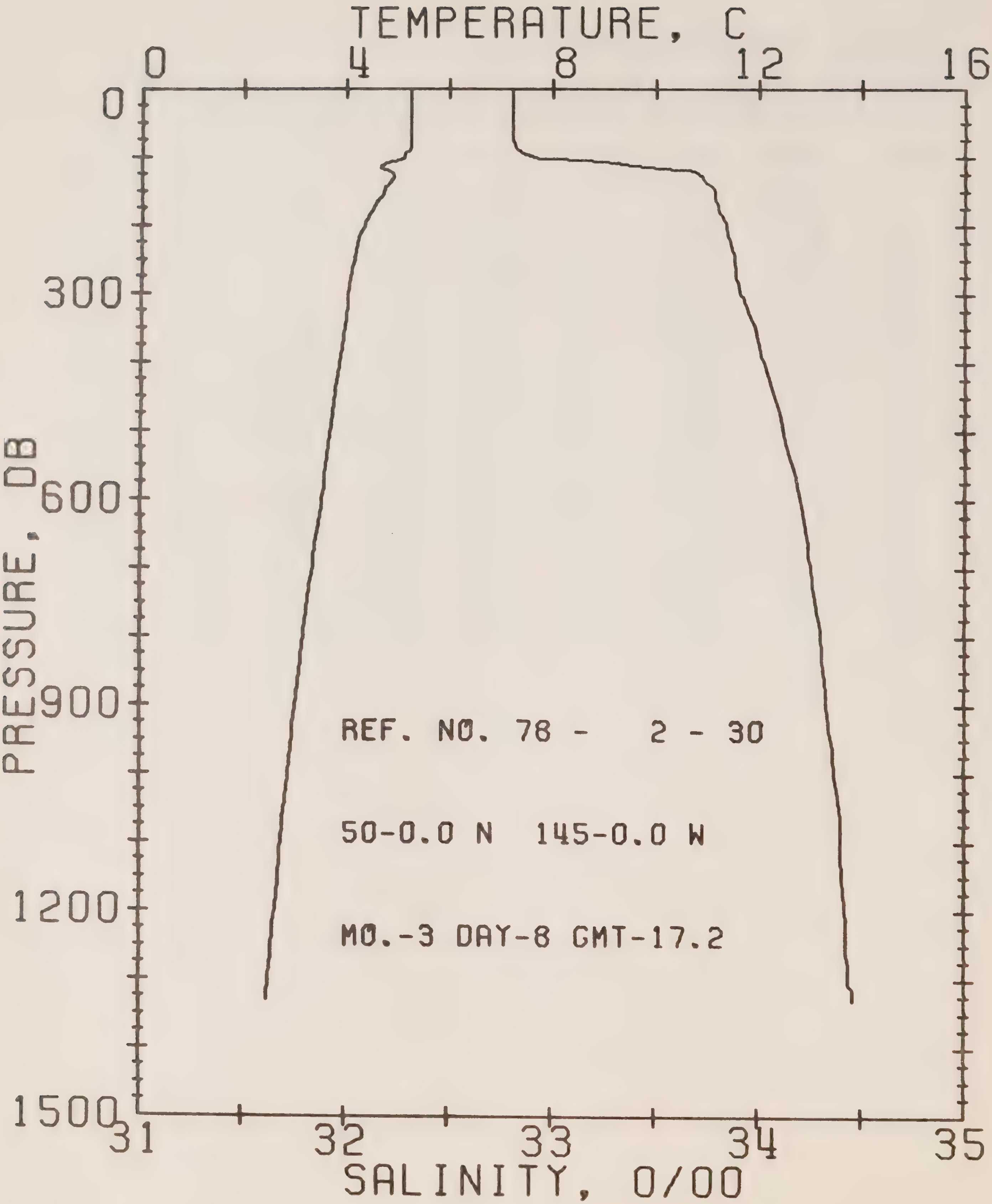
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 28 DATE 6/ 3/75 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.3
RESULTS OF STP CAST 93 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	PCT. EN	SOUND
0	5.30	32.82	0	25.94	207.3	0.0	0.0	[illegible]
10	5.30	32.81	10	25.93	208.4	0.21	0.01	[illegible]
20	5.31	32.81	20	25.93	208.5	0.42	0.04	1470.
30	5.30	32.81	30	25.93	208.6	0.63	0.10	1470.
50	5.30	32.81	50	25.93	208.8	1.04	0.27	1470.
75	5.23	32.82	75	25.95	207.4	1.56	0.60	1470.
100	4.87	33.29	99	26.36	168.6	2.05	1.03	1470.
125	4.87	33.71	124	26.69	137.3	2.43	1.46	1471.
150	4.82	33.79	149	26.76	131.1	2.76	1.93	1471.
175	4.53	33.81	174	26.81	126.7	3.08	2.46	1470.
200	4.38	33.83	199	26.84	123.9	3.40	3.06	1470.
225	4.28	33.85	223	26.87	121.4	3.70	3.72	1470.
250	4.20	33.88	248	26.90	118.8	4.00	4.45	1470.
300	4.07	33.91	298	26.94	115.5	4.50	6.09	1471.


TEMPERATURE, C
0
4
8
12
16
PRESSURE, DB
0
300
600
900
1200
1500
REF. NO. 78 - 2 - 29
50-0.0 N 145-0.0 W
MO.-3 DAY-7 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

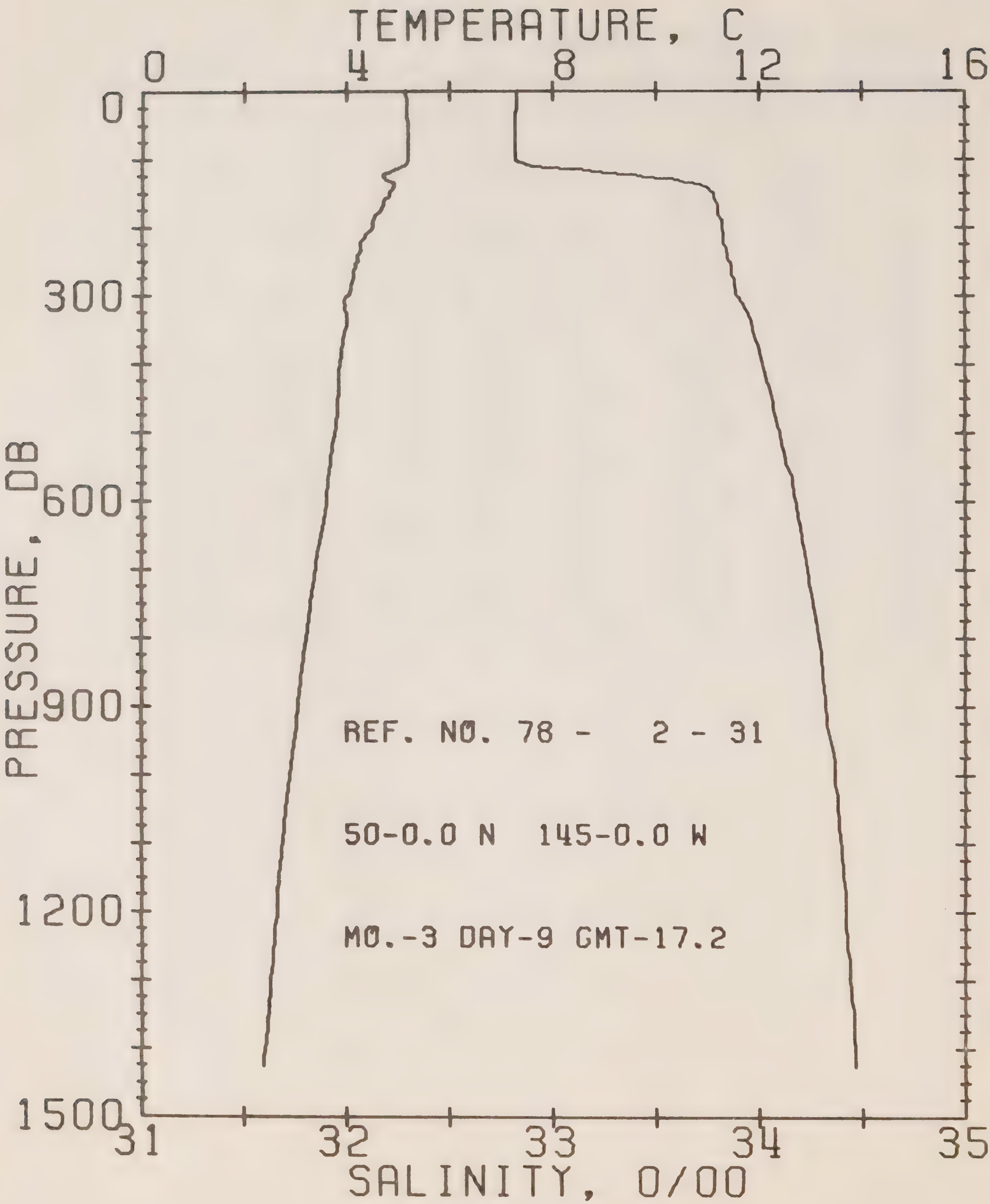
OFFSHCRE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 29 DATE 7/ 3/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.2
RESULTS OF STP CAST , 168 POINTS TAKEN FROM ANALOG T-ACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.25	32.81	0	25.94	207.6	0.0	0.0	1469.
10	5.25	32.81	10	25.94	207.9	0.21	0.01	1469.
20	5.25	32.81	20	25.94	208.0	0.42	0.04	1469.
30	5.26	32.81	30	25.94	208.2	0.62	0.10	1470.
50	5.26	32.81	50	25.94	208.3	1.04	0.27	1470.
75	5.25	32.80	75	25.93	209.2	1.56	0.60	1470.
100	5.27	32.80	99	25.93	209.7	2.04	1.06	1471.
125	4.78	33.45	124	26.50	155.8	2.56	1.60	1470.
150	4.80	33.73	149	26.72	135.3	2.91	2.10	1471.
175	4.59	33.77	174	26.77	130.3	3.24	2.65	1471.
200	4.38	33.81	199	26.82	125.4	3.55	3.26	1470.
225	4.22	33.82	223	26.85	123.1	3.87	3.93	1470.
250	4.06	33.85	248	26.89	119.4	4.15	4.67	1470.
300	3.94	33.89	298	26.93	115.6	4.77	6.31	1470.
400	3.83	34.01	397	27.04	106.0	5.87	10.26	1471.
500	3.73	34.10	496	27.12	99.6	6.90	14.97	1473.
600	3.56	34.18	595	27.20	92.2	7.86	20.35	1474.
800	3.19	34.28	793	27.32	82.6	9.60	32.72	1476.
1000	2.87	34.37	990	27.42	73.6	11.15	46.93	1478.
1200	2.60	34.42	1188	27.48	68.0	12.56	62.71	1480.


TEMPERATURE, C
0
4
8
12
16
PRESSURE, DB
0
300
600
900
1200
1500
REF. NO. 78 - 2 - 30
50-0.0 N 145-0.0 W
MO.-3 DAY-8 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

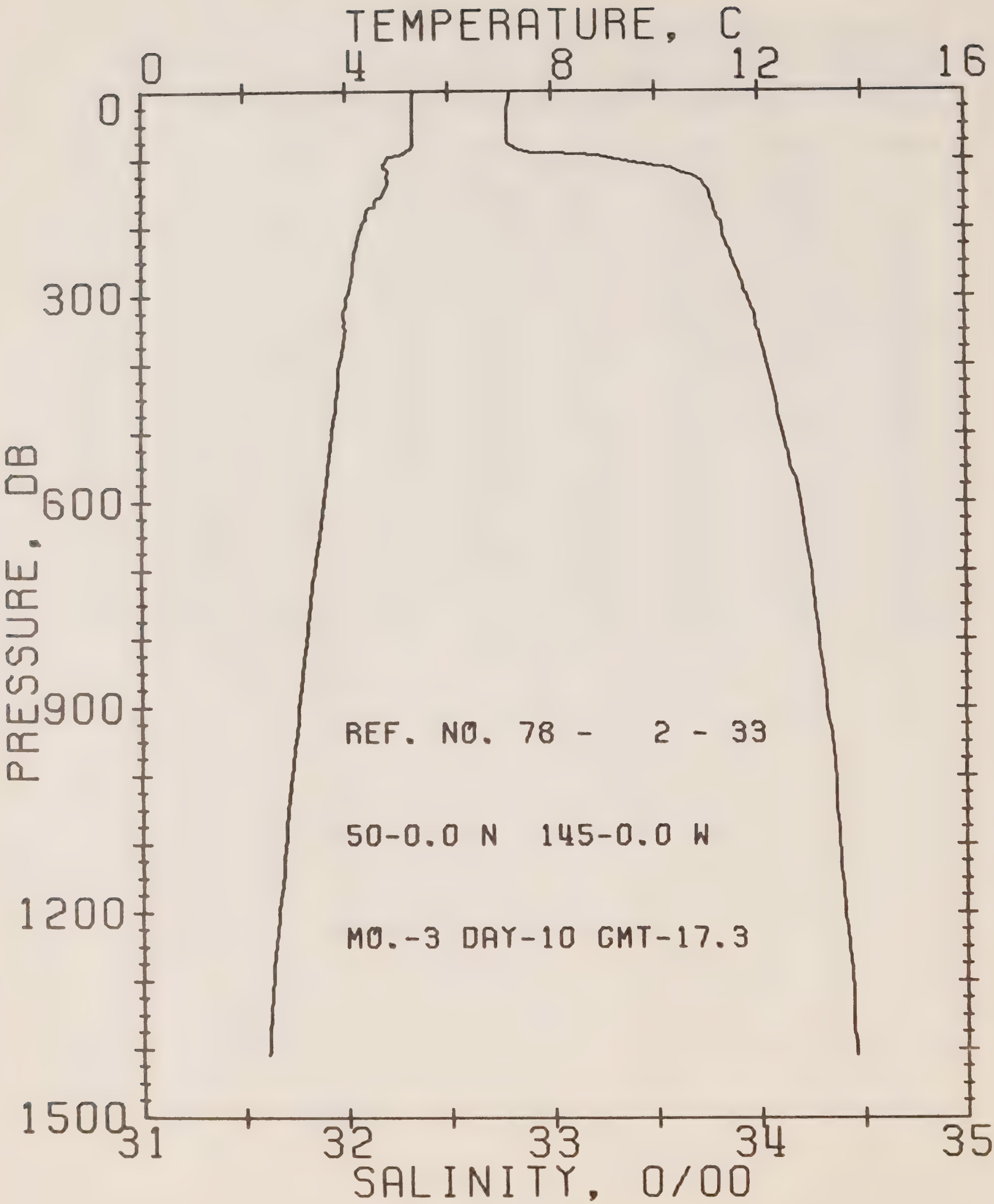
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 30 DATE 3/ 3/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.2
RESULTS OF STP CAST 157 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	[illegible]
0	5.24	32.81	0	25.94	207.4	0.0	0.0	[illegible]
10	5.24	32.81	10	25.94	207.7	0.21	0.01	[illegible]
20	5.25	32.81	20	25.94	207.9	0.42	0.04	[illegible]
30	5.26	32.81	30	25.94	208.2	0.62	0.10	1470.
50	5.26	32.81	50	25.94	208.3	1.04	0.[illegible]7	1470.
75	5.25	32.81	75	25.94	208.5	1.5[illegible]	0.[illegible]	1470.
100	5.12	32.90	99	26.03	200.1	2.03	1.0[illegible]	1470.
125	4.93	33.71	124	26.68	138.3	2.4[illegible]	1.52	1471.
150	4.73	33.79	149	26.77	130.3	2.82	1.[illegible]	1471.
175	4.52	33.80	174	26.80	127.2	3.14	2.32	1470.
200	4.34	33.84	199	26.85	122.6	3.45	3.11	1470.
225	4.22	33.86	223	26.88	120.1	3.7[illegible]	3.77	1470.
250	4.15	33.88	248	26.91	118.1	4.0[illegible]	4.4[illegible]	1470.
300	4.02	33.91	298	26.94	114.9	4.63	6.12	1470.
400	3.88	34.03	397	27.05	105.5	5.73	10.04	1472.
500	3.63	34.12	496	27.14	97.5	6.74	14.67	1472.
600	3.53	34.20	595	27.22	90.4	7.63	19.22	1474.
800	3.16	34.30	793	27.34	80.4	9.39	32.36	1475.
1000	2.88	34.37	990	27.42	73.7	10.93	46.20	1478.
1200	2.62	34.42	1188	27.48	68.1	12.34	61.99	1480.


TEMPERATURE, C
0
4
8
12
16
PRESSURE, DB
0
300
600
900
1200
1500
REF. NO. 78 - 2 - 31
50-0.0 N 145-0.0 W
MO.-3 DAY-9 GMT-17.2
31
32
33
34
35
SALINITY, O/OO

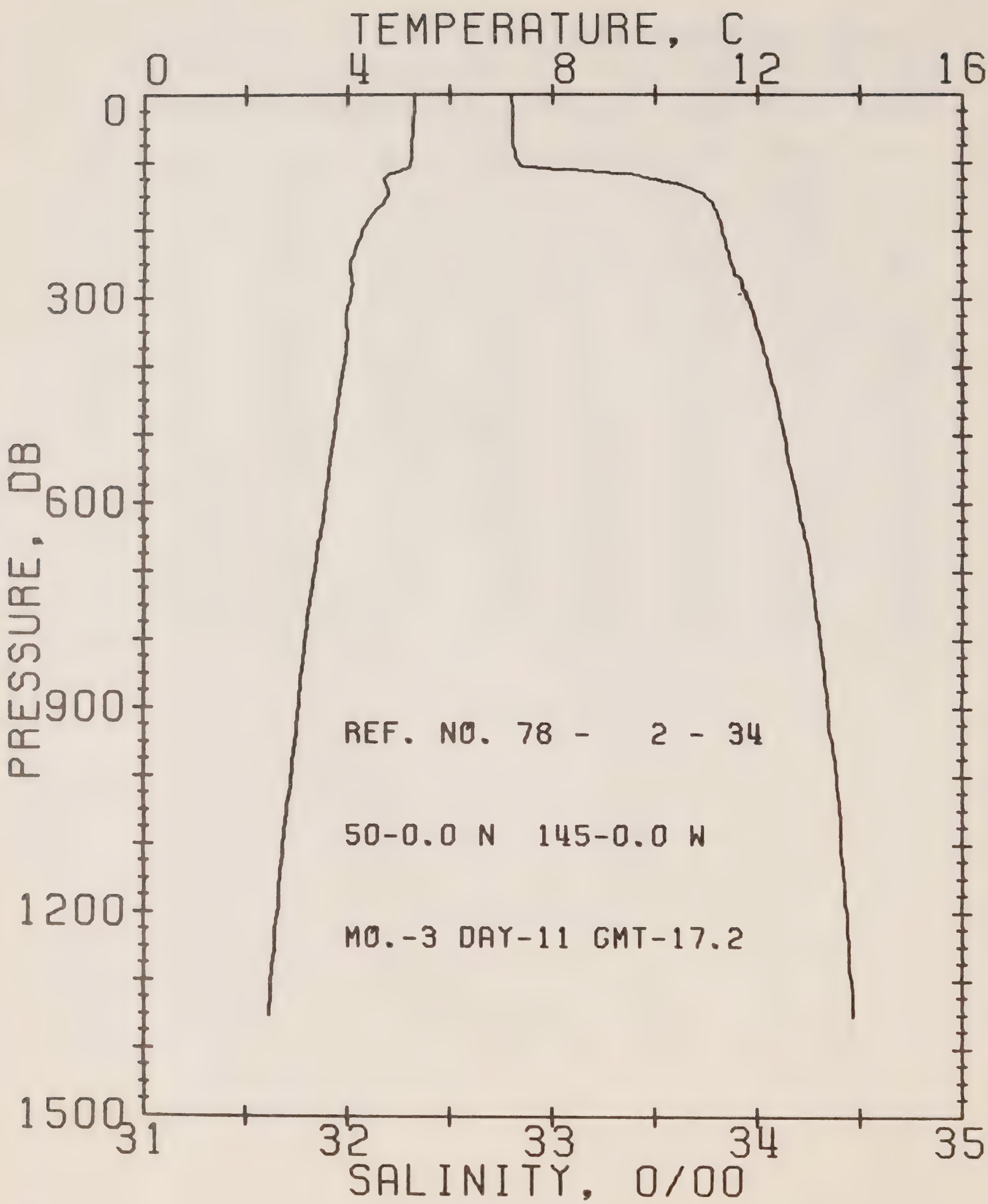
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 31   DATE 9/ 3/78   STATION P
POSITION 50- 0.0N, 145- 0.0W   GMT 17.2
RESULTS OF STP CAST   194 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA	PCT. EN	SOUND
0	5.16	32.83	0	25.96	205.0	0.0	0.0	1469.
10	5.17	32.83	10	25.96	205.5	0.21	0.01	1469.
20	5.17	32.83	20	25.96	205.6	0.41	0.04	1469.
30	5.18	32.83	30	25.96	206.0	0.62	0.09	1469.
50	5.19	32.82	50	25.95	206.8	1.03	0.26	1470.
75	5.19	32.82	75	25.95	207.0	1.55	0.59	1470.
100	5.19	32.82	99	25.95	207.3	2.06	1.05	1471.
125	4.71	33.44	124	26.50	155.9	2.54	1.59	1470.
150	4.83	33.78	149	26.75	131.9	2.89	2.08	1471.
175	4.64	33.80	174	26.79	128.6	3.21	2.62	1471.
200	4.50	33.82	199	26.82	125.8	3.53	3.22	1471.
225	4.27	33.83	223	26.85	122.9	3.84	3.90	1470.
250	4.23	33.86	248	26.88	120.5	4.14	4.63	1470.
300	4.03	33.89	298	26.93	116.5	4.73	6.29	1470.
400	3.87	34.01	397	27.04	106.4	5.84	10.22	1472.
500	3.75	34.10	496	27.12	99.5	6.87	14.94	1473.
600	3.60	34.18	595	27.20	93.0	7.83	20.32	1474.
800	3.20	34.29	793	27.32	81.9	9.57	32.73	1476.
1000	2.88	34.37	990	27.42	73.5	11.13	46.99	1478.
1200	2.63	34.42	1188	27.48	68.3	12.55	62.83	1480.


TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 2 - 33
50-0.0 N 145-0.0 W
MO.-3 DAY-10 GMT-17.3
31
32
33
34
35
SALINITY, 0/00

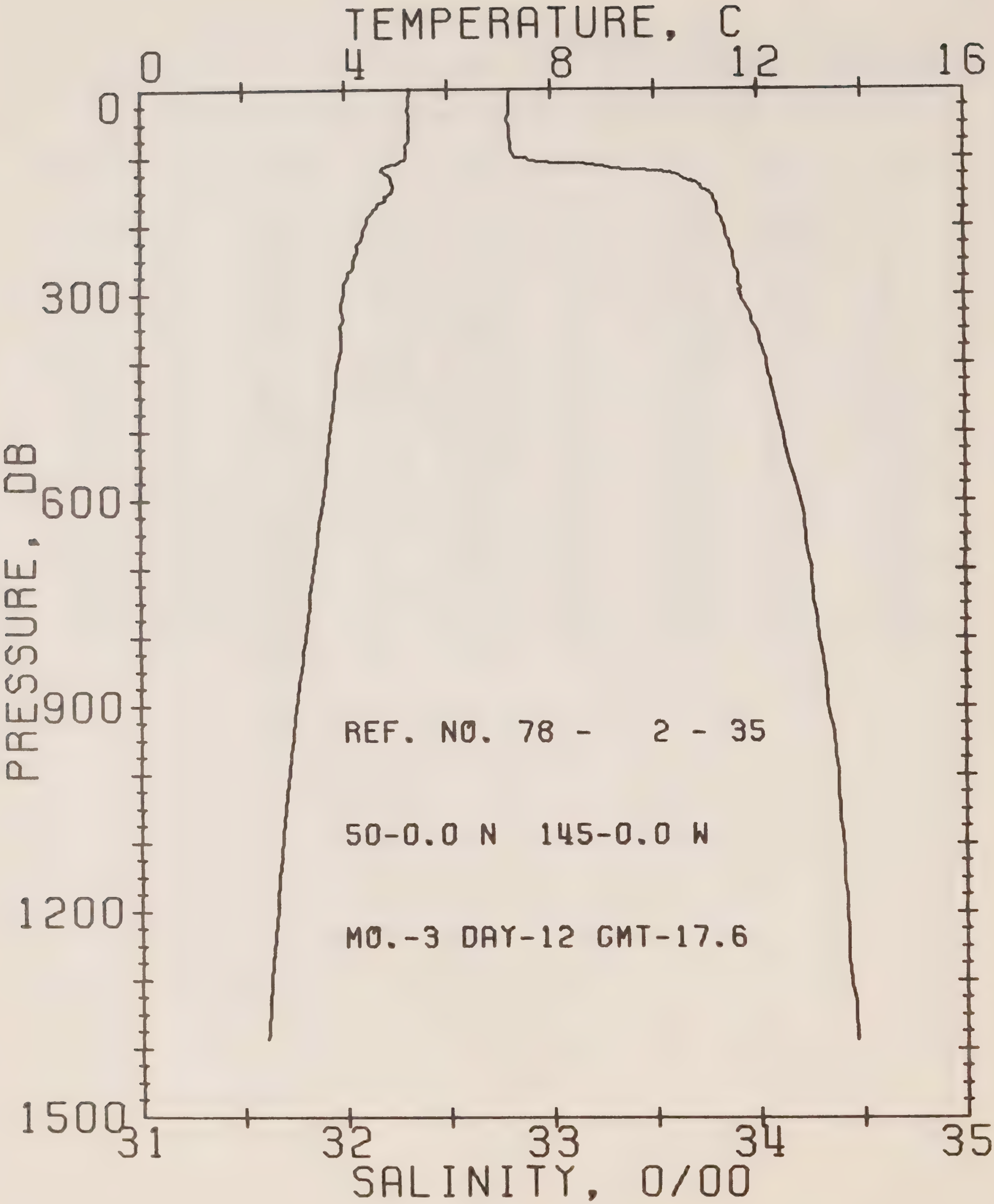
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 33 DATE 10/ 3/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.3
RESULTS OF STP CAST 174 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.31	32.80	0	25.92	208.9	0.0	0.0	1469.
10	5.31	32.80	10	25.92	209.2	0.21	0.01	1470.
20	5.30	32.79	20	25.92	209.6	0.42	0.04	1470.
30	5.30	32.79	30	25.92	210.1	0.63	0.10	1470.
50	5.30	32.79	50	25.92	210.2	1.05	0.27	1470.
75	5.30	32.79	75	25.92	210.5	1.57	0.60	1471.
100	4.82	33.31	99	26.38	165.5	2.06	1.04	1470.
125	4.81	33.69	124	26.69	137.9	2.44	1.46	1471.
150	4.72	33.76	149	26.75	132.0	2.78	1.94	1471.
175	4.43	33.79	174	26.80	127.1	3.10	2.47	1470.
200	4.30	33.82	199	26.85	123.4	3.41	3.07	1470.
225	4.22	33.85	223	26.87	120.9	3.72	3.73	1470.
250	4.14	33.88	248	26.90	118.2	4.02	4.46	1470.
300	4.01	33.94	298	26.97	112.6	4.59	6.07	1470.
400	3.86	34.04	397	27.06	104.5	5.68	9.93	1471.
500	3.70	34.11	496	27.14	98.1	6.69	14.37	1473.
600	3.54	34.20	595	27.22	90.5	7.63	19.85	1474.
800	3.20	34.29	793	27.32	81.8	9.35	32.09	1476.
1000	2.91	34.37	990	27.41	74.2	10.91	45.38	1478.
1200	2.65	34.41	1188	27.47	69.3	12.35	62.51	1480.


TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 2 - 34
50-0.0 N 145-0.0 W
MO.-3 DAY-11 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

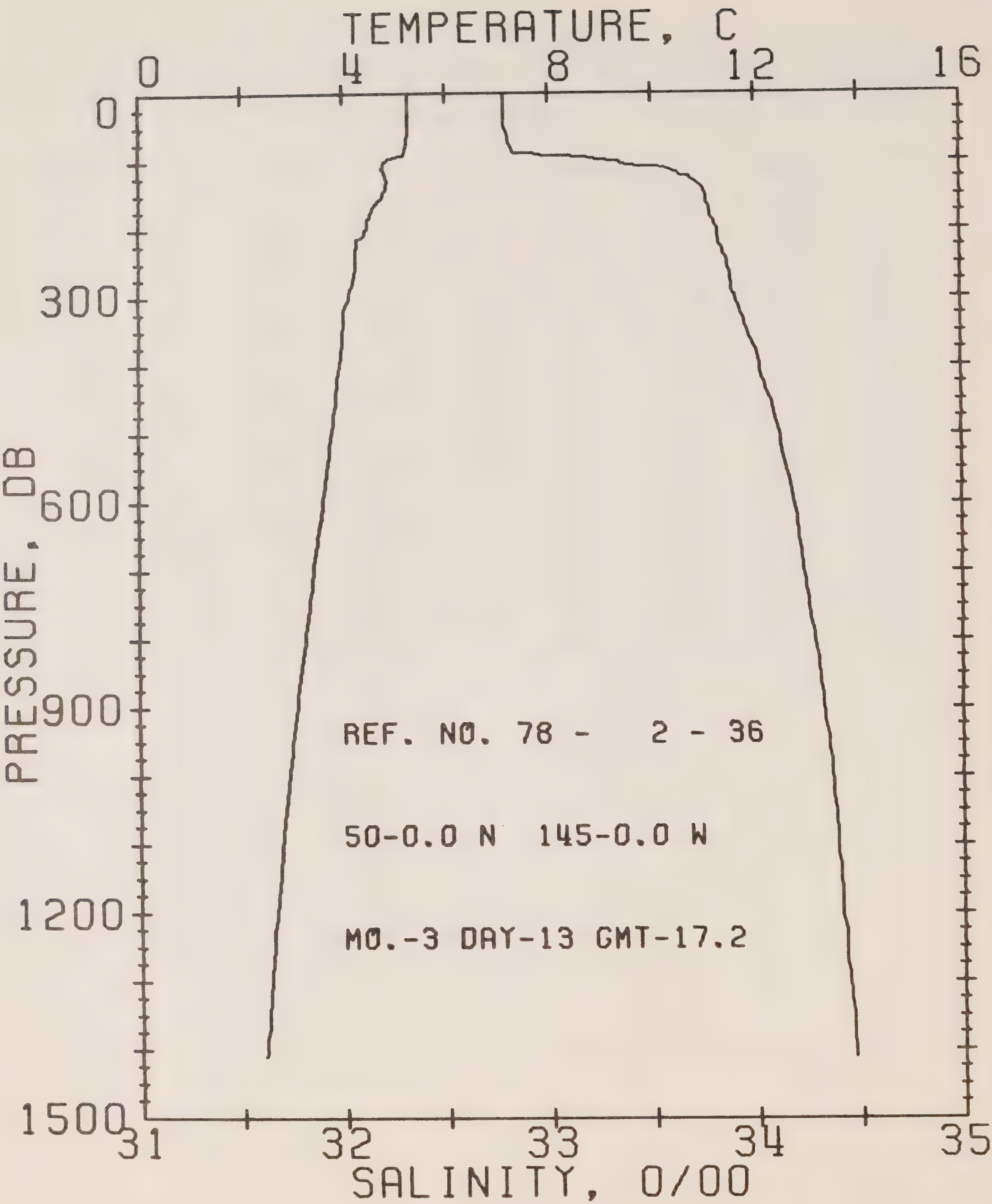
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 34   DATE 11/ 3/78   STATION P
POSITION 50- 0.0N, 145- 0.0W   GMT 17.2
RESULTS OF STP CAST / 188 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.32	32.80	0	25.92	209.0	0.0	0.0	1469.
10	5.32	32.80	10	25.92	209.3	0.21	0.01	1470.
20	5.32	32.81	20	25.93	208.7	0.42	0.04	1470.
30	5.28	32.81	30	25.93	208.4	0.63	0.10	1470.
50	5.27	32.81	50	25.94	208.4	1.04	0.27	1470.
75	5.25	32.81	75	25.94	208.5	1.56	0.60	1470.
100	5.23	32.83	99	25.96	206.8	2.08	1.06	1471.
125	4.73	33.51	124	26.55	150.7	2.54	1.58	1470.
150	4.78	33.74	149	26.73	134.0	2.89	2.07	1471.
175	4.50	33.80	174	26.80	127.1	3.21	2.61	1470.
200	4.29	33.83	199	26.85	122.9	3.53	3.20	1470.
225	4.16	33.85	223	26.88	120.2	3.83	3.86	1470.
250	4.05	33.87	248	26.91	117.6	4.13	4.58	1470.
300	4.04	33.95	298	26.97	112.1	4.70	6.19	1471.
400	3.92	34.05	397	27.06	104.2	5.78	10.03	1472.
500	3.73	34.13	496	27.15	95.9	6.78	14.62	1473.
600	3.56	34.20	595	27.22	91.0	7.72	19.89	1474.
800	3.17	34.31	793	27.34	80.2	9.42	31.99	1475.
1000	2.90	34.39	990	27.43	72.6	10.95	45.96	1478.
1200	2.62	34.44	1188	27.49	66.9	12.34	61.53	1480.


TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 2 - 35
50-0.0 N 145-0.0 W
MO.-3 DAY-12 GMT-17.6
31
32
33
34
35
SALINITY, 0/00

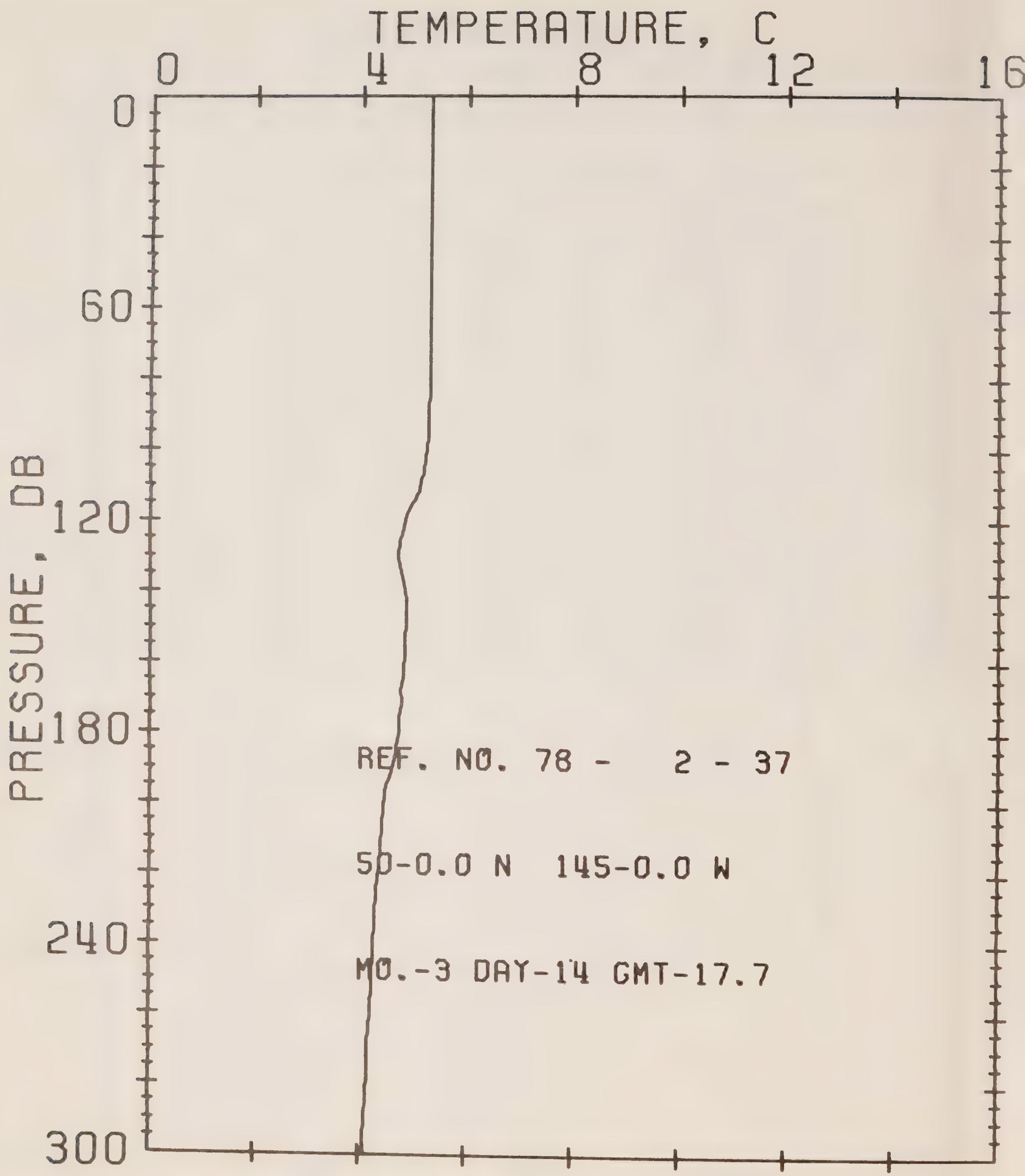
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 35   DATE 12/ 3/78   STATION P
POSITION 50- 0.0N, 145- 0.0W   GMT 17.6
RESULTS OF STP CAST   201 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.25	32.81	0	25.94	207.5	0.0	0.0	1469.
10	5.25	32.80	10	25.93	208.6	0.21	0.01	1469.
20	5.24	32.80	20	25.93	208.6	0.42	0.04	1469.
30	5.23	32.80	30	25.93	208.6	0.63	0.10	1470.
50	5.25	32.79	50	25.92	209.5	1.04	0.27	1470.
75	5.24	32.80	75	25.93	209.1	1.57	0.60	1470.
100	5.19	32.83	99	25.96	206.6	2.09	1.06	1471.
125	4.83	33.61	124	26.62	144.5	2.52	1.56	1471.
150	4.93	33.76	149	26.73	134.5	2.87	2.05	1472.
175	4.57	33.81	174	26.81	127.1	3.20	2.59	1470.
200	4.39	33.84	199	26.85	123.4	3.51	3.19	1470.
225	4.24	33.86	223	26.88	120.3	3.82	3.85	1470.
250	4.16	33.88	248	26.90	118.2	4.12	4.57	1470.
300	3.97	33.91	298	26.95	114.4	4.69	6.19	1470.
400	3.85	34.04	397	27.06	104.3	5.73	10.06	1471.
500	3.70	34.12	496	27.14	97.8	6.79	14.69	1473.
600	3.54	34.20	595	27.22	90.7	7.74	19.98	1474.
800	3.19	34.29	793	27.32	81.8	9.45	32.21	1476.
1000	2.87	34.38	990	27.43	72.7	10.99	46.30	1478.
1200	2.63	34.42	1188	27.48	68.2	12.40	62.06	1480.


TEMPERATURE, C
0
4
8
12
16
PRESSURE, DB
0
300
600
900
1200
1500
REF. NO. 78 - 2 - 36
50-0.0 N 145-0.0 W
MO.-3 DAY-13 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

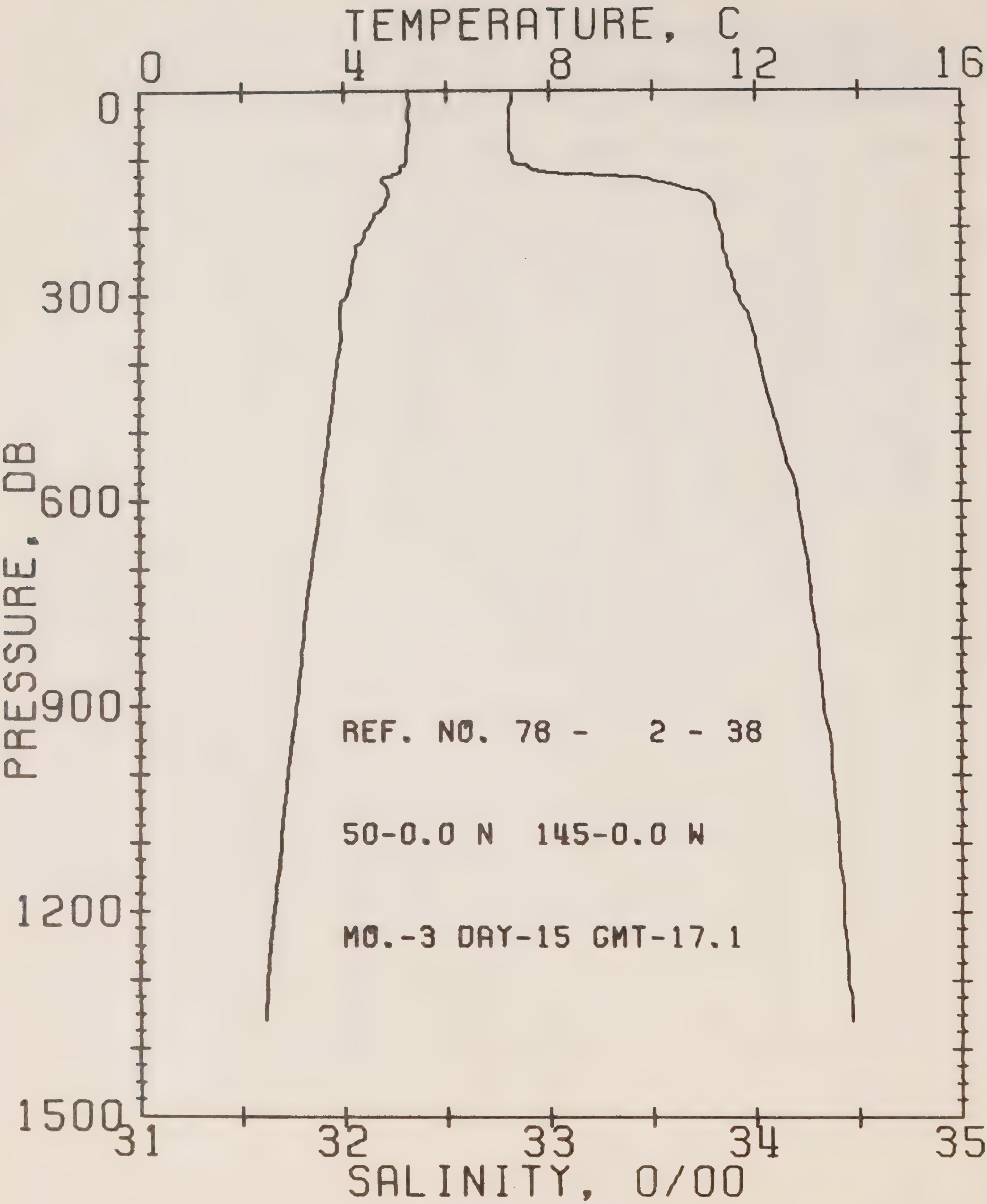
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 36   DATE 13/ 3/78   STATION P
POSITION 50- 0.0N, 145- 0.0W   GMT 17.2
RESULTS OF STP CAST / 198 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.28	32.79	0	25.92	209.4	0.0	0.0	1469.
10	5.28	32.79	10	25.92	209.7	0.21	0.01	1469.
20	5.29	32.79	20	25.92	209.9	0.42	0.04	1470.
30	5.29	32.79	30	25.92	210.0	0.63	0.10	1470.
50	5.28	32.79	50	25.92	210.1	1.05	0.27	1470.
75	5.24	32.81	75	25.94	208.2	1.57	0.60	1470.
100	4.86	33.33	99	26.39	165.4	2.06	1.04	1470.
125	4.87	33.69	124	26.67	139.1	2.44	1.46	1471.
150	4.78	33.76	149	26.74	132.9	2.78	1.94	1471.
175	4.54	33.78	174	26.78	129.0	3.10	2.48	1470.
200	4.45	33.82	199	26.83	125.3	3.42	3.09	1470.
225	4.26	33.83	223	26.86	122.6	3.73	3.76	1470.
250	4.25	33.87	248	26.89	119.9	4.04	4.49	1470.
300	4.10	33.90	298	26.93	116.5	4.63	6.15	1471.
400	3.91	34.02	397	27.04	105.3	5.74	10.10	1472.
500	3.75	34.12	496	27.13	98.3	6.76	14.79	1473.
600	3.57	34.18	595	27.20	92.3	7.71	20.13	1474.
800	3.22	34.28	793	27.31	82.7	9.46	32.57	1476.
1000	2.91	34.36	990	27.41	74.4	11.02	46.88	1478.
1200	2.64	34.41	1188	27.47	69.2	12.45	62.89	1480.


TEMPERATURE, C
0
4
8
12
16
PRESSURE, DB
0
60
120
180
240
300
REF. NO. 78 - 2 - 37
50-0.0 N 145-0.0 W
MO.-3 DAY-14 GMT-17.7

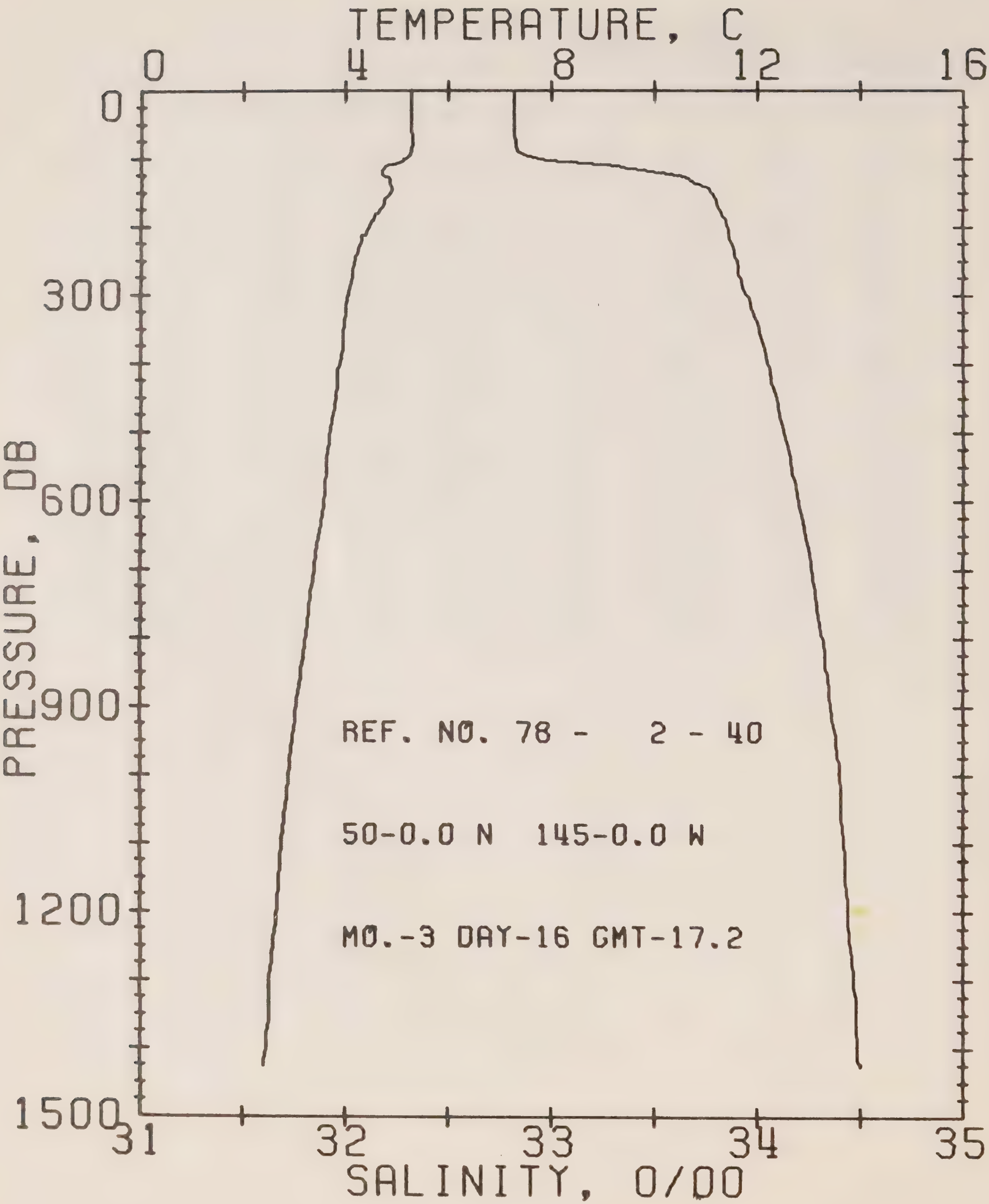
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 37   DATE 14/ 3/78   STATION P
POSITION 50- 0.0N, 145- 0.0W   GMT 17.7
RESULTS OF STP CAST   59 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.30							
10	5.31							
20	5.32							
30	5.31							
50	5.31							
75	5.30							
100	5.25							
125	4.76							
150	4.87							
175	4.77							
200	4.46							
225	4.32							
250	4.24							
300	4.08							


TEMPERATURE, C
0
4
8
12
16
PRESSURE, DB
0
300
600
900
1200
1500
REF. NO. 78 - 2 - 38
50-0.0 N 145-0.0 W
MO.-3 DAY-15 GMT-17.1
31
32
33
34
35
SALINITY, O/OO

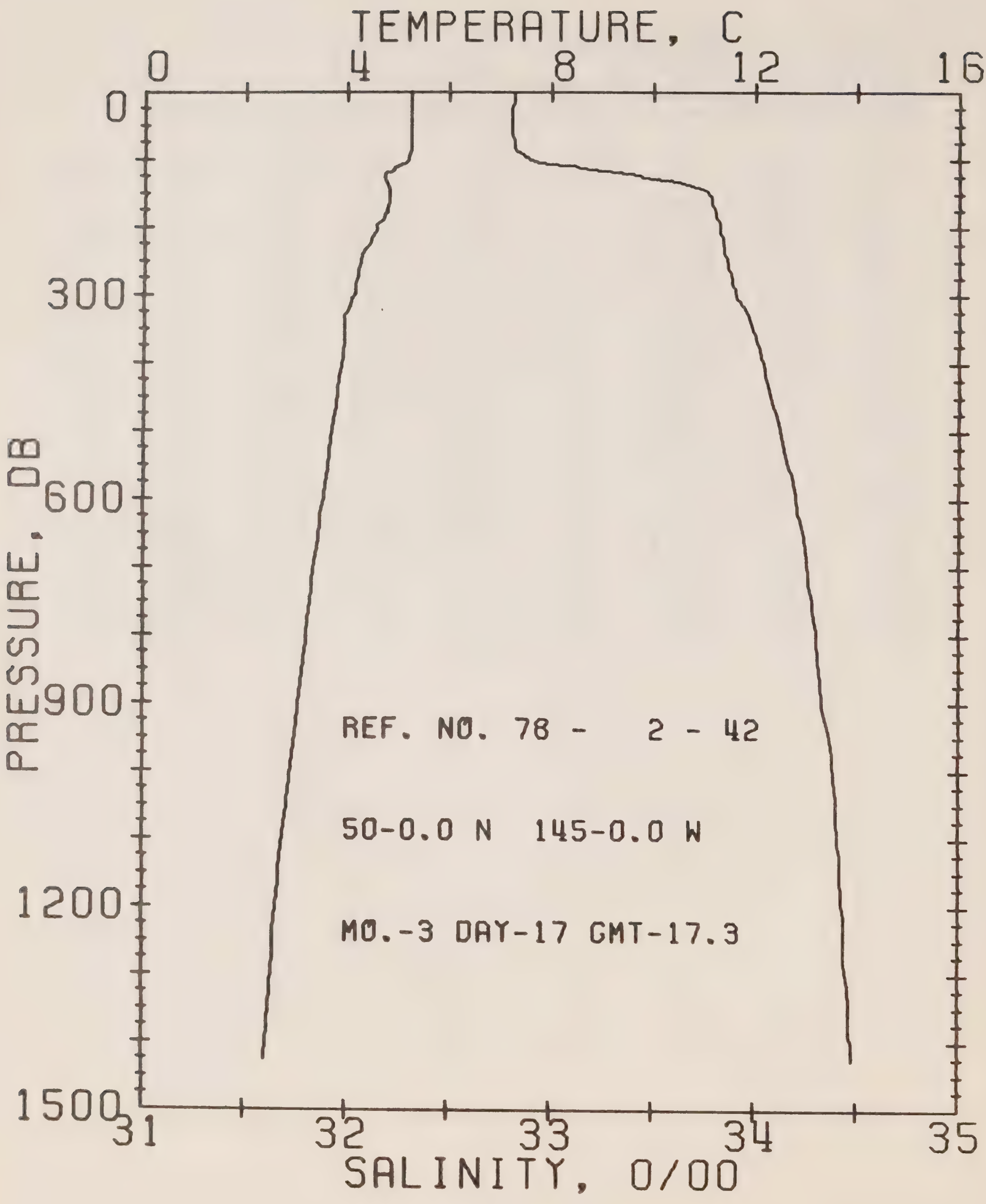
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 38 DATE 15/ 3/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.1
RESULTS OF STP CAST 196 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.26	32.82	0	25.94	206.9	0.0	0.0	[illegible]
10	5.26	32.82	10	25.94	207.2	0.21	0.01	[illegible]
20	5.27	32.82	20	25.94	207.5	0.41	0.04	1470.
30	5.26	32.81	30	25.94	208.2	0.62	0.10	1470.
50	5.27	32.81	50	25.94	208.4	1.04	0.27	1470.
75	5.25	32.81	75	25.94	208.5	1.55	0.60	1470.
100	5.22	32.82	99	25.95	207.7	2.03	1.05	1471.
125	4.94	33.41	124	26.45	160.6	2.53	1.63	1471.
150	4.89	33.75	149	26.72	134.8	2.94	2.14	1471.
175	4.72	33.81	174	26.79	128.8	3.27	2.68	1471.
200	4.50	33.83	199	26.83	125.0	3.59	3.29	1471.
225	4.25	33.84	223	26.86	121.9	3.90	3.96	1470.
250	4.19	33.86	248	26.89	119.9	4.20	4.69	1470.
300	4.04	33.92	298	26.95	114.4	4.79	6.33	1470.
400	3.86	34.02	397	27.05	105.8	5.88	10.22	1471.
500	3.70	34.11	496	27.14	98.0	6.90	14.90	[illegible]
600	3.54	34.21	595	27.23	90.1	7.84	20.15	1474.
800	3.19	34.30	793	27.33	80.9	9.54	32.31	1475.
1000	2.88	34.37	990	27.42	73.3	11.09	46.47	[illegible]
1200	2.61	34.43	1188	27.49	67.4	12.49	62.17	1480.


TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 2 - 40
50-0.0 N 145-0.0 W
MO.-3 DAY-16 GMT-17.2
31
32
33
34
35
SALINITY, O/OO

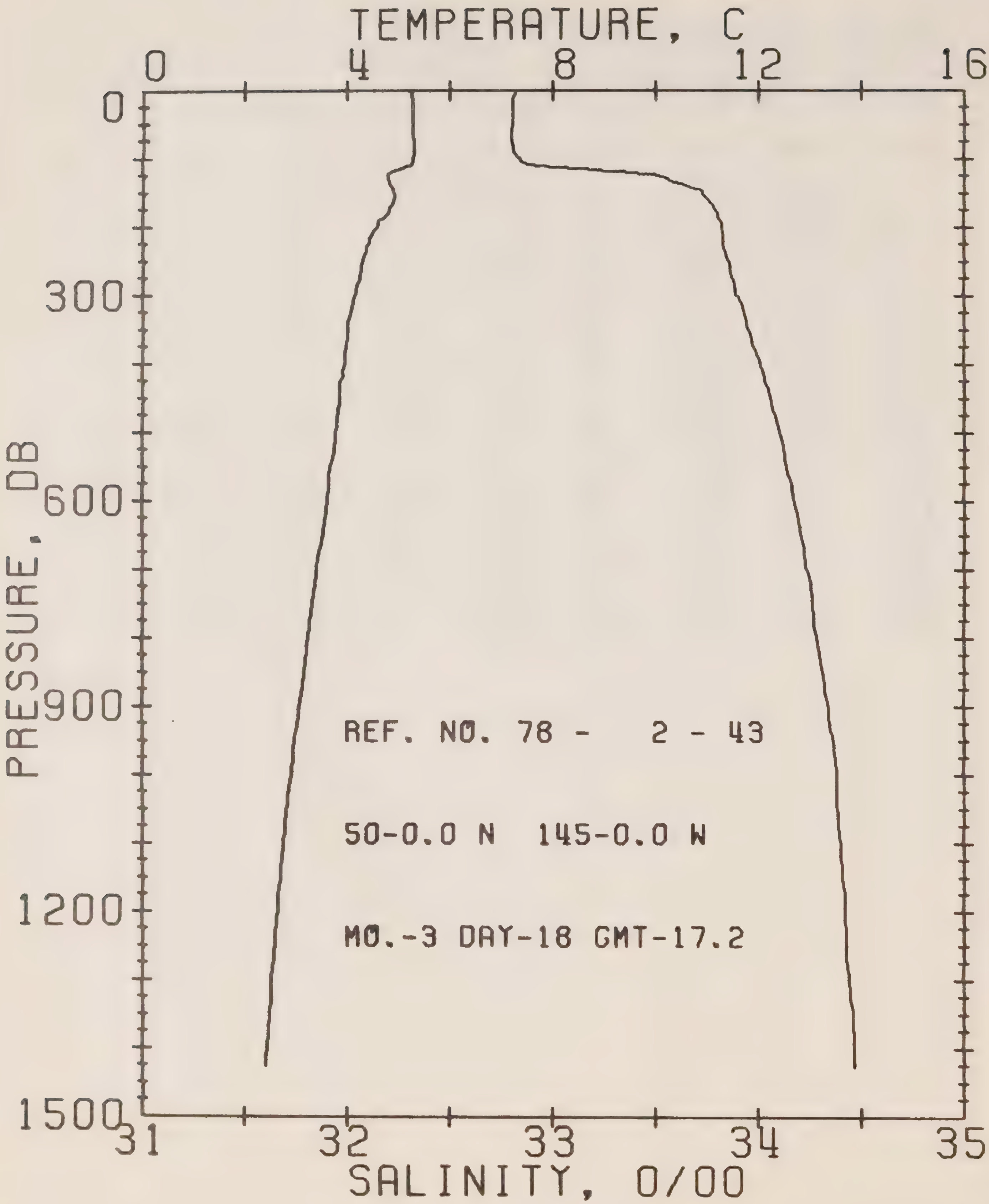
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 40 DATE 15/ 3/75 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.2
RESULTS OF STP CAST 185 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.27	32.82	0	25.94	207.0	0.0	0.0	1469.
10	5.28	32.82	10	25.94	207.4	0.21	0.01	1469.
20	5.28	32.82	20	25.94	207.5	0.41	0.04	1470.
30	5.28	32.82	30	25.94	207.6	0.62	0.10	1470.
50	5.28	32.82	50	25.94	207.8	1.04	0.26	1470.
75	5.30	32.83	75	25.95	207.6	1.56	0.60	1471.
100	5.18	32.95	99	26.06	197.4	2.07	1.05	1471.
125	4.76	33.63	124	26.64	142.2	2.49	1.53	1470.
150	4.88	33.77	149	26.74	132.9	2.83	2.01	1471.
175	4.67	33.81	174	26.80	127.8	3.16	2.55	1471.
200	4.44	33.85	199	26.85	122.8	3.47	3.14	1470.
225	4.29	33.87	223	26.89	119.8	3.77	3.80	1470.
250	4.18	33.90	248	26.92	117.1	4.07	4.52	1470.
300	4.04	33.95	298	26.97	112.1	4.64	6.13	1471.
400	3.88	34.05	397	27.07	103.7	5.72	9.96	1472.
500	3.69	34.13	496	27.15	96.6	6.72	14.55	1473.
600	3.58	34.20	595	27.22	91.2	7.86	19.80	1474.
800	3.21	34.32	793	27.34	79.9	9.35	31.93	1475.
1000	2.89	34.40	990	27.44	71.5	10.87	45.76	1473.
1200	2.65	34.44	1188	27.49	67.1	12.25	61.22	1480.


TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 2 - 42
50-0.0 N 145-0.0 W
MO.-3 DAY-17 GMT-17.3
31
32
33
34
35
SALINITY, 0/00

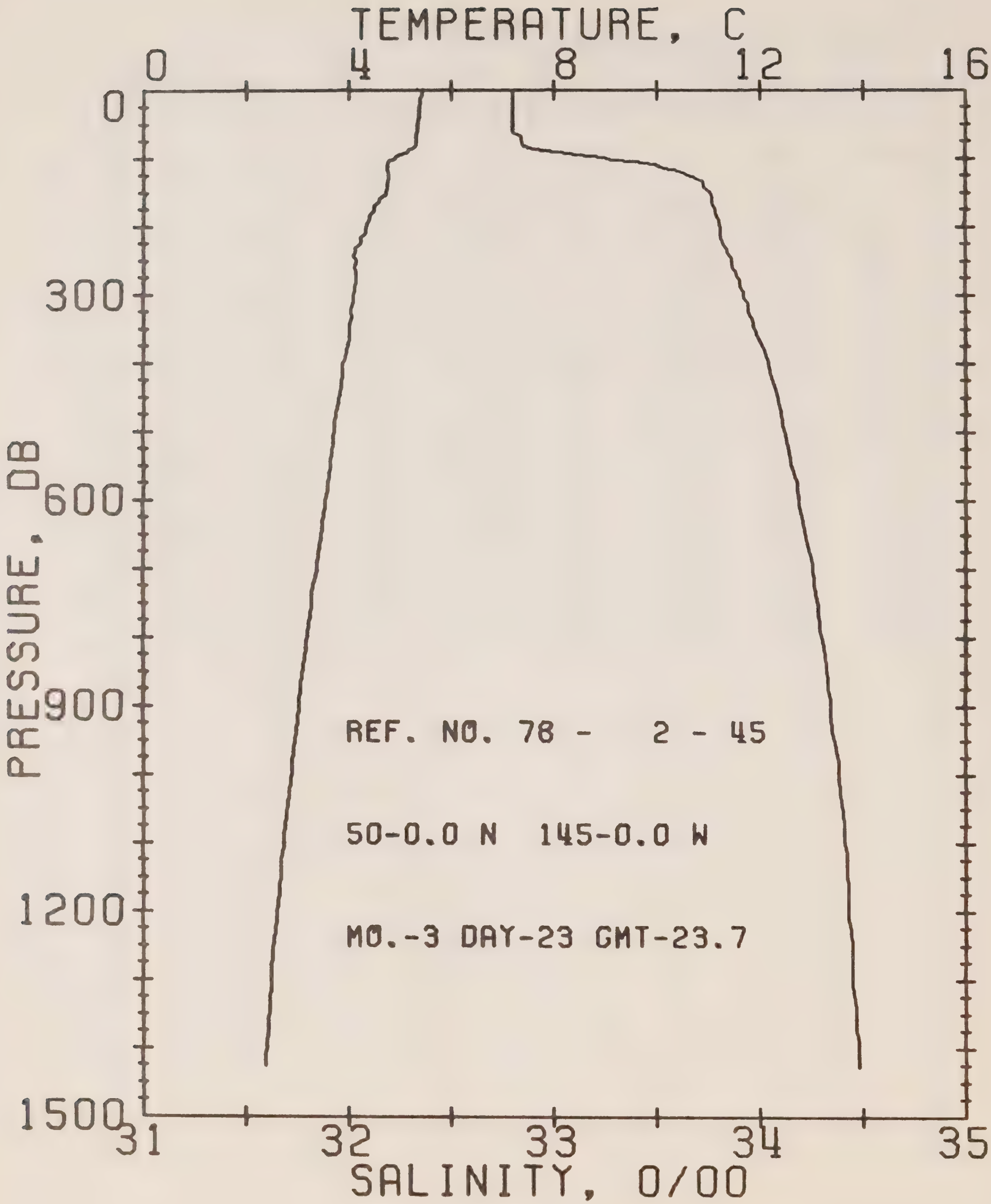
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 42 DATE 17/ 3/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.3
RESULTS OF STP CAST 200 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.25	32.82	0	25.95	206.7	0.0	0.0	1469.
10	5.25	32.82	10	25.95	207.1	0.21	0.01	1469.
20	5.25	32.82	20	25.94	207.3	0.41	0.04	1469.
30	5.25	32.81	30	25.94	208.1	0.62	0.10	1470.
50	5.25	32.81	50	25.94	208.3	1.04	0.26	1470.
75	5.26	32.82	75	25.94	207.8	1.56	0.60	1470.
100	5.19	32.90	99	26.01	201.6	2.07	1.06	1471.
125	4.73	33.44	124	26.49	156.1	2.52	1.56	1470.
150	4.84	33.77	149	26.74	133.0	2.87	2.06	1471.
175	4.78	33.80	174	26.77	130.1	3.20	2.60	1471.
200	4.58	33.83	199	26.82	126.0	3.52	3.21	1471.
225	4.43	33.84	223	26.84	123.9	3.83	3.89	1471.
250	4.28	33.86	248	26.88	120.9	4.14	4.63	1471.
300	4.14	33.91	298	26.93	116.2	4.73	6.29	1471.
400	3.90	34.04	397	27.06	104.8	5.82	10.17	1472.
500	3.71	34.12	496	27.14	97.5	6.83	14.81	1473.
600	3.54	34.20	595	27.22	90.5	7.77	20.07	1474.
800	3.20	34.30	793	27.33	81.0	9.43	32.22	1475.
1000	2.90	34.39	990	27.43	72.7	11.03	46.35	1478.
1200	2.61	34.43	1188	27.49	67.2	12.42	61.98	1480.


TEMPERATURE, C
0
4
8
12
16
PRESSURE, DB
0
300
600
900
1200
1500
REF. NO. 78 - 2 - 43
50-0.0 N 145-0.0 W
MO.-3 DAY-18 GMT-17.2
31
32
33
34
35
SALINITY, O/OO

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 43 DATE 18/ 3/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.2
RESULTS OF STP CAST 192 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.25	32.82	0	25.95	206.7	0.0	0.0	1469.
10	5.27	32.81	10	25.94	207.3	0.21	0.01	1469.
20	5.28	32.81	20	25.93	208.2	0.42	0.04	1470.
30	5.28	32.81	30	25.93	208.3	0.62	0.10	1470.
50	5.28	32.81	50	25.93	208.5	1.04	0.27	1470.
75	5.30	32.80	75	25.92	209.8	1.56	0.60	1471.
100	5.28	32.83	99	25.95	207.2	2.09	1.06	1471.
125	4.80	33.52	124	26.55	151.0	2.55	1.59	1470.
150	4.92	33.73	149	26.70	136.6	2.91	2.10	1471.
175	4.81	33.79	174	26.76	131.5	3.25	2.65	1471.
200	4.57	33.82	199	26.81	126.6	3.57	3.27	1471.
225	4.39	33.83	223	26.84	124.1	3.88	3.94	1471.
250	4.29	33.85	248	26.87	121.7	4.19	4.69	1471.
300	4.13	33.89	298	26.92	117.6	4.79	6.36	1471.
400	3.94	34.01	397	27.03	107.5	5.91	10.36	1472.
500	3.77	34.10	496	27.12	99.7	6.94	15.09	1473.
600	3.59	34.17	595	27.19	93.2	7.90	20.48	1474.
800	3.22	34.28	793	27.32	82.5	9.65	32.91	1476.
1000	2.90	34.38	990	27.42	73.0	11.20	47.09	1478.
1200	2.63	34.42	1188	27.48	68.2	12.61	62.93	1480.


TEMPERATURE, C
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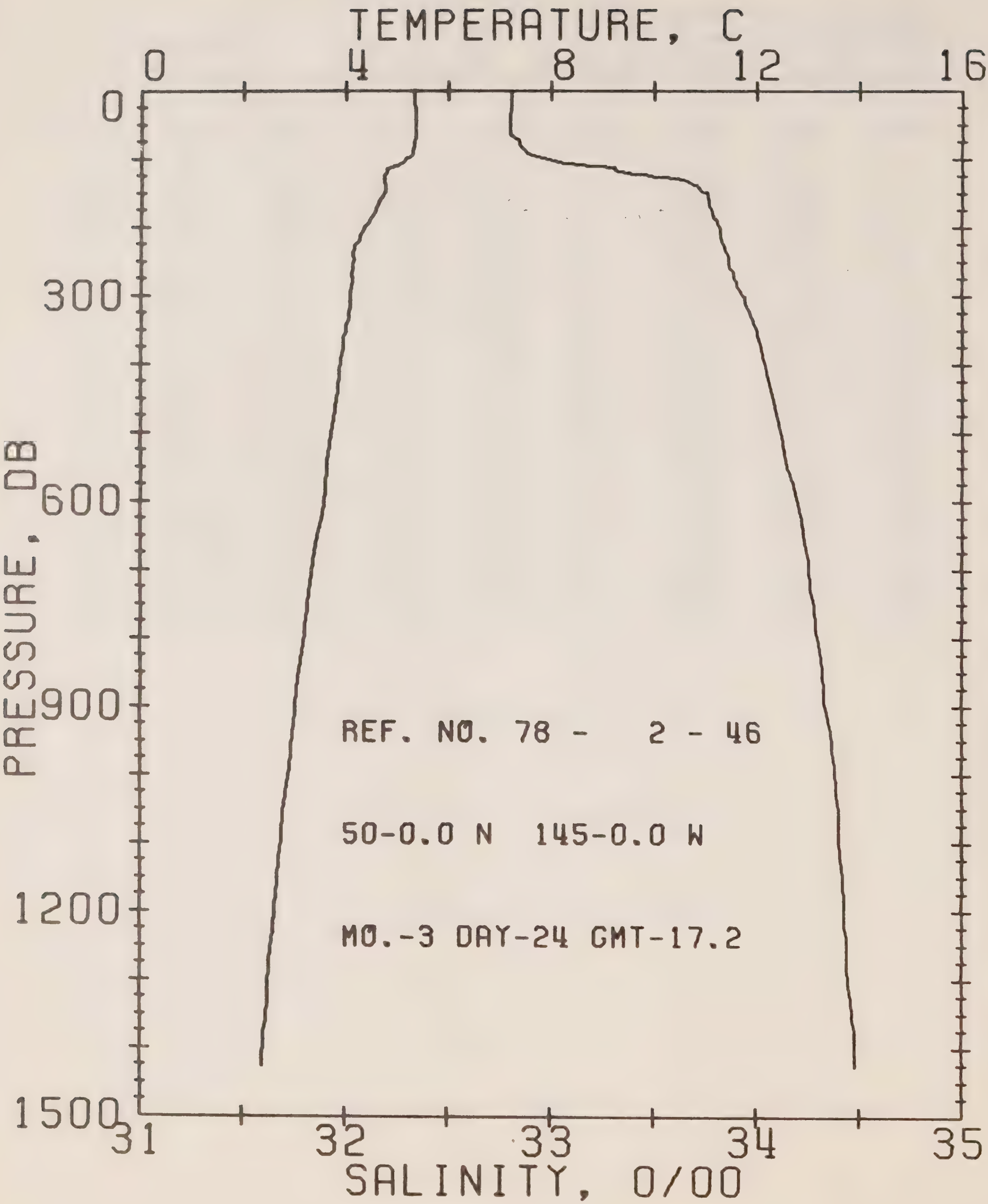
PRESSURE, DB
REF. NO. 78 - 2 - 45
50-0.0 N 145-0.0 W
MO.-3 DAY-23 GMT-23.7
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 45 DATE 23/ 3/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 23.7
RESULTS OF STP CAST 208 POINTS TAKEN FROM ANALCG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.43	32.80	0	25.91	210.3	0.0	0.0	1470.
10	5.41	32.80	10	25.91	210.3	0.21	0.01	1470.
20	5.37	32.80	20	25.92	210.1	0.42	0.04	1470.
30	5.35	32.80	30	25.92	209.9	0.63	0.10	1470.
50	5.33	32.80	50	25.92	209.9	1.05	0.27	1470.
75	5.32	32.84	75	25.96	206.8	1.57	0.60	1471.
100	4.91	33.26	99	26.33	171.2	2.06	1.03	1470.
125	4.77	33.67	124	26.67	139.3	2.44	1.46	1470.
150	4.71	33.75	149	26.74	132.8	2.78	1.94	1471.
175	4.49	33.78	174	26.79	128.5	3.10	2.48	1470.
200	4.34	33.81	199	26.83	125.1	3.42	3.08	1470.
225	4.19	33.82	223	26.85	122.8	3.73	3.76	1470.
250	4.12	33.86	248	26.89	119.3	4.03	4.48	1470.
300	4.08	33.92	298	26.94	114.8	4.62	6.13	1471.
400	3.87	34.04	397	27.06	104.5	5.72	10.04	1472.
500	3.70	34.12	496	27.14	97.4	6.72	14.66	1473.
600	3.52	34.19	595	27.21	91.2	7.67	19.94	1474.
800	3.16	34.30	793	27.34	80.6	9.38	32.13	1475.
1000	2.86	34.38	990	27.43	72.6	10.91	46.14	1478.
1200	2.60	34.43	1188	27.49	67.3	12.30	61.68	1480.


TEMPERATURE, C
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16
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300
600
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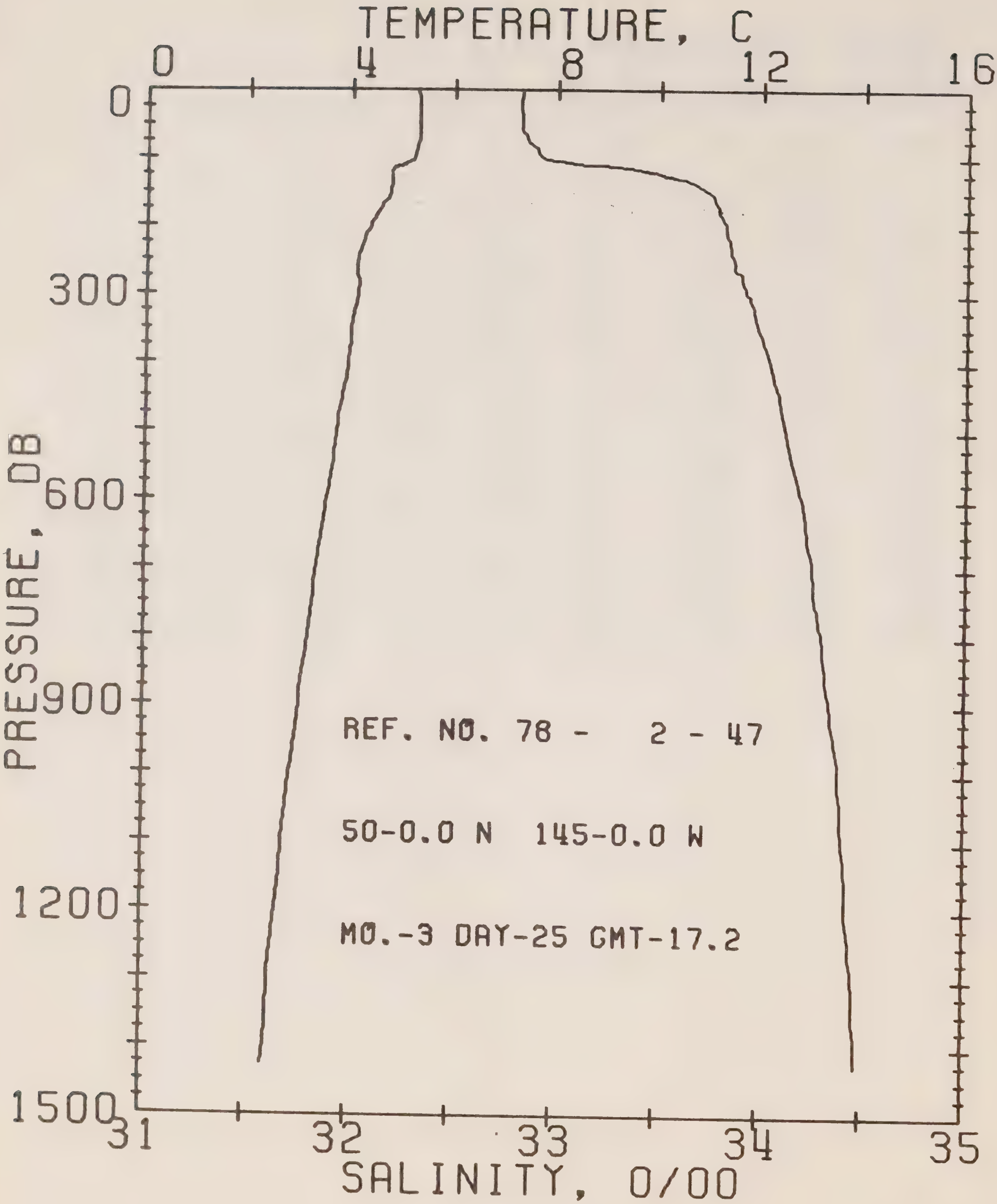
1200
1500
PRESSURE, DB
REF. NO. 78 - 2 - 46
50-0.0 N 145-0.0 W
MO.-3 DAY-24 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 46 DATE 24/ 3/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.2
RESULTS OF STP CAST 198 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.34	32.82	0	25.94	207.7	0.0	0.0	1470.
10	5.33	32.81	10	25.93	208.7	0.21	0.01	1470.
20	5.34	32.81	20	25.93	209.0	0.42	0.04	1470.
30	5.35	32.81	30	25.93	209.2	0.63	0.10	1470.
50	5.36	32.80	50	25.92	210.2	1.05	0.27	1470.
75	5.34	32.84	75	25.95	207.0	1.57	0.60	1471.
100	5.20	32.97	99	26.07	195.8	2.08	1.05	1471.
125	4.76	33.51	124	26.55	151.1	2.51	1.55	1470.
150	4.75	33.75	149	26.74	133.0	2.85	2.04	1471.
175	4.57	33.78	174	26.78	129.6	3.19	2.59	1470.
200	4.36	33.82	199	26.83	124.7	3.51	3.19	1470.
225	4.20	33.83	223	26.86	121.8	3.82	3.85	1470.
250	4.15	33.86	248	26.89	119.6	4.12	4.53	1470.
300	4.09	33.93	298	26.95	114.1	4.70	6.22	1471.
400	3.89	34.04	397	27.06	104.7	5.79	10.10	1472.
500	3.71	34.12	496	27.14	97.7	6.80	14.74	1473.
600	3.56	34.20	595	27.22	91.1	7.75	20.04	1474.
800	3.18	34.29	793	27.33	81.1	9.46	32.21	1476.
1000	2.88	34.38	990	27.43	72.6	10.99	46.25	1478.
1200	2.61	34.43	1188	27.49	67.3	12.39	61.90	1480.


TEMPERATURE, C
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300
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900
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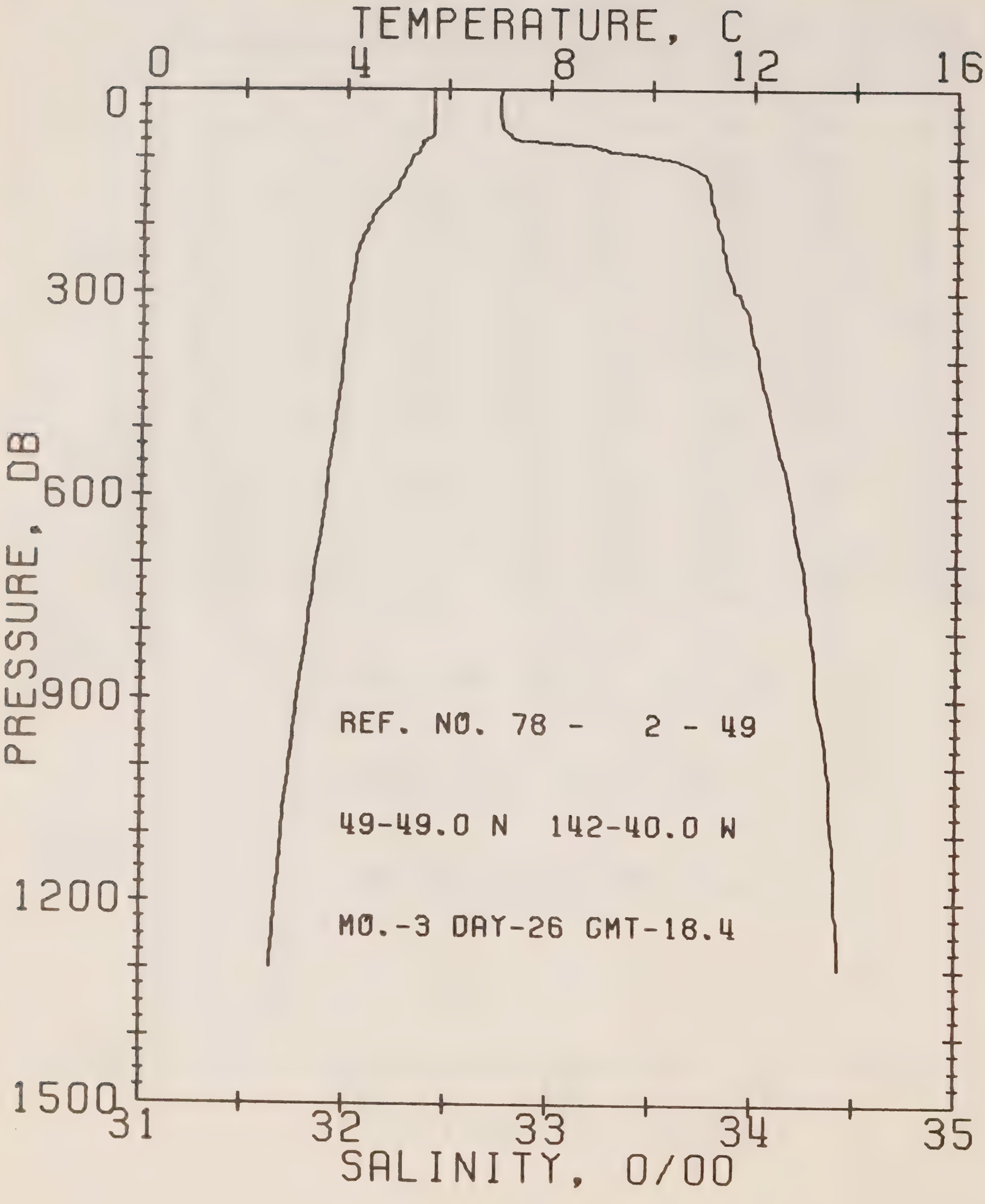
PRESSURE, DB
REF. NO. 78 - 2 - 47
50-0.0 N 145-0.0 W
MO.-3 DAY-25 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 47 DATE 25/ 3/7 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.2
RESULTS OF STP CAST 188 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.28	32.83	0	25.95	206.4	0.0	0.0	1469.
10	5.30	32.83	10	25.95	206.9	0.21	0.01	1470.
20	5.30	32.82	20	25.94	207.7	0.41	0.04	1470.
30	5.30	32.82	30	25.94	207.8	0.62	0.10	1470.
50	5.32	32.83	50	25.95	207.5	1.04	0.26	1470.
75	5.30	32.85	75	25.97	205.6	1.55	0.59	1471.
100	5.20	32.93	99	26.04	199.2	2.06	1.04	1471.
125	4.78	33.52	124	26.55	150.6	2.49	1.54	1470.
150	4.75	33.74	149	26.73	134.0	2.84	2.03	1471.
175	4.55	33.79	174	26.79	128.4	3.17	2.57	1470.
200	4.36	33.82	199	26.84	124.4	3.49	3.18	1470.
225	4.22	33.84	223	26.87	121.6	3.80	3.84	1470.
250	4.12	33.86	248	26.89	119.1	4.10	4.57	1470.
300	4.13	33.93	298	26.95	114.5	4.68	6.21	1471.
400	3.95	34.04	397	27.05	105.3	5.78	10.11	1472.
500	3.73	34.12	496	27.14	97.9	6.79	14.75	1473.
600	3.54	34.20	595	27.22	90.2	7.74	20.04	1474.
800	3.19	34.30	793	27.34	80.7	9.45	32.23	1476.
1000	2.87	34.39	990	27.43	72.0	10.98	46.24	1478.
1200	2.62	34.43	1188	27.49	67.4	12.37	61.81	1480.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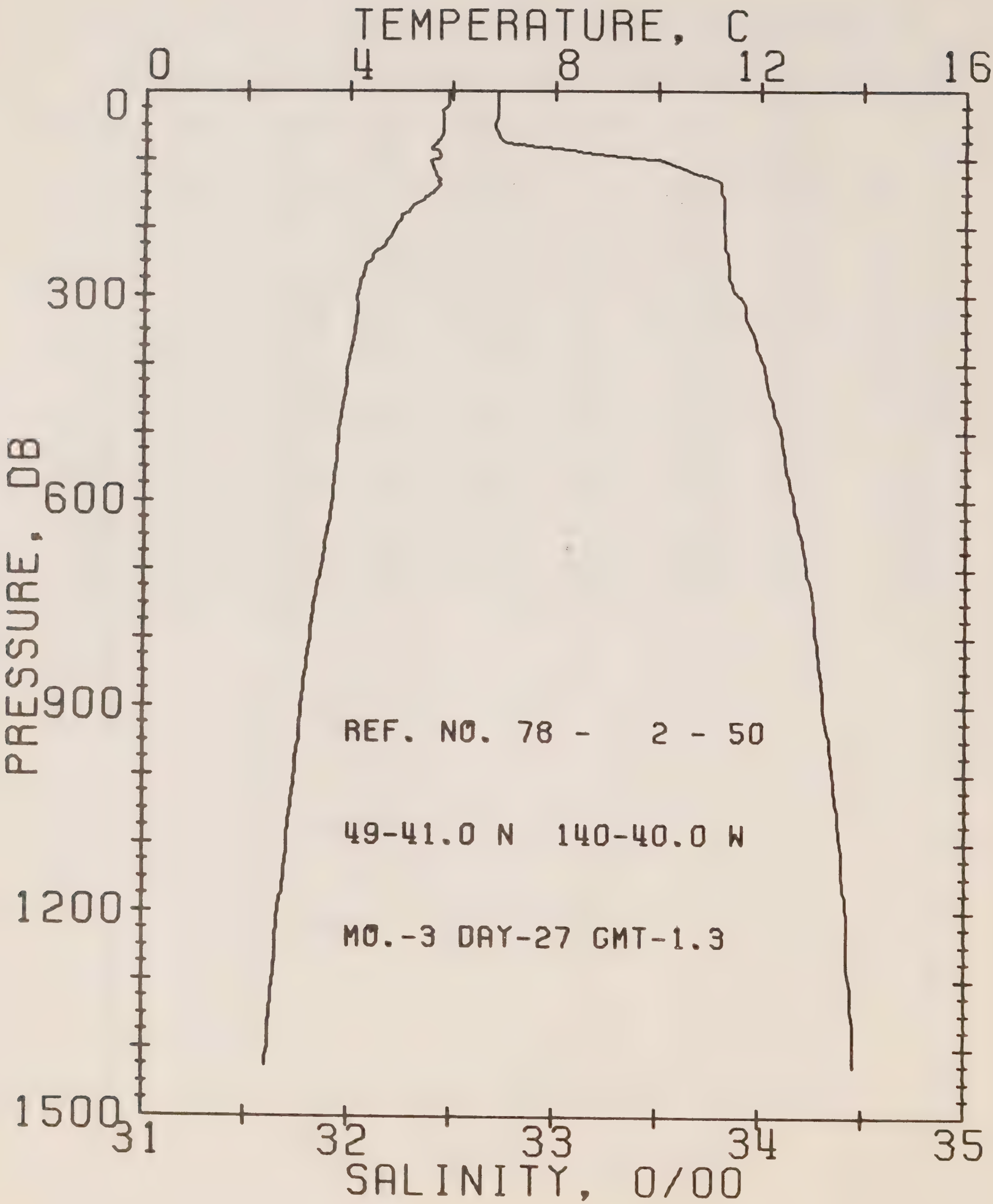
PRESSURE, DB
REF. NO. 78 - 2 - 49
49-49.0 N 142-40.0 W
MO.-3 DAY-26 GMT-18.4
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 49   DATE 26/ 3/78   STATION 12
POSITION 49-49.0N, 142-40.0W   GMT 13.4
RESULTS OF STP CAST   175 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.72	32.76	0	25.84	216.5	0.0	0.0	1471.
10	5.72	32.76	10	25.84	217.1	0.22	0.01	1471.
20	5.72	32.75	20	25.84	217.7	0.43	0.04	1471.
30	5.72	32.75	30	25.84	217.8	0.65	0.10	1471.
50	5.72	32.76	50	25.84	217.3	1.09	0.28	1472.
75	5.55	32.85	75	25.93	208.9	1.53	0.62	1472.
100	5.30	33.52	99	26.49	155.1	2.07	1.02	1472.
125	5.12	33.75	124	26.70	137.1	2.43	1.43	1472.
150	4.95	33.79	149	26.75	132.5	2.77	1.90	1472.
175	4.64	33.80	174	26.79	128.5	3.10	2.44	1471.
200	4.45	33.82	199	26.83	125.3	3.41	3.05	1470.
225	4.28	33.85	223	26.87	121.4	3.72	3.71	1470.
250	4.18	33.86	248	26.89	119.9	4.02	4.44	1470.
300	4.08	33.92	298	26.94	114.8	4.61	6.09	1471.
400	3.94	34.03	397	27.05	106.0	5.71	9.99	1472.
500	3.78	34.10	496	27.12	100.1	6.74	14.72	1473.
600	3.62	34.18	595	27.20	92.8	7.70	20.10	1474.
800	3.24	34.29	793	27.32	82.2	9.45	32.52	1476.
1000	2.91	34.37	990	27.41	74.0	11.01	46.87	1478.
1200	2.66	34.41	1188	27.47	69.4	12.44	62.87	1480.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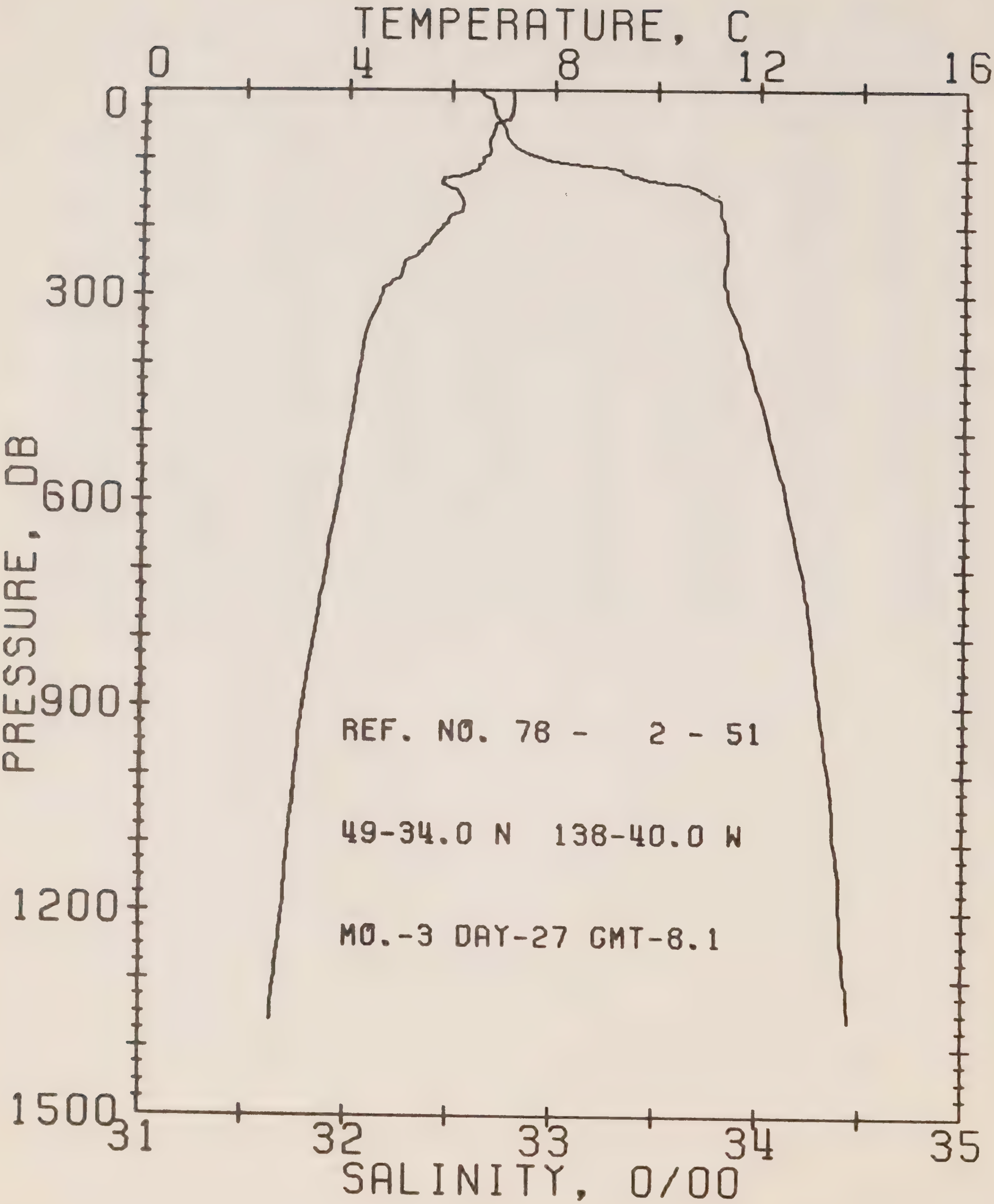
PRESSURE, DB
REF. NO. 78 - 2 - 50
49-41.0 N 140-40.0 W
MO.-3 DAY-27 GMT-1.3
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 50   DATE 27/ 3/78   STATION 11
POSITION 49-41.0N, 140-40.0W   GMT 1.3
RESULTS OF STP CAST   223 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	PCT. EN	SOUND
0	5.91	32.72	0	25.79	221.7	0.0	0.0	1472.
10	5.92	32.72	10	25.79	222.1	0.22	0.01	1472.
20	5.90	32.72	20	25.79	222.0	0.44	0.05	1472.
30	5.81	32.72	30	25.80	221.0	0.67	0.10	1472.
50	5.80	32.71	50	25.79	221.9	1.11	0.28	1472.
75	5.71	32.75	75	25.84	217.9	1.66	0.63	1472.
100	5.73	33.48	99	26.41	164.0	2.14	1.05	1474.
125	5.72	33.74	124	26.62	144.8	2.53	1.30	1474.
150	5.61	33.81	149	26.69	138.6	2.88	1.99	1474.
175	5.16	33.82	174	26.75	132.9	3.22	2.55	1473.
200	4.88	33.82	199	26.78	130.0	3.55	3.18	1472.
225	4.68	33.83	223	26.81	127.3	3.87	3.88	1472.
250	4.39	33.84	248	26.85	123.7	4.18	4.64	1471.
300	4.14	33.89	298	26.91	117.7	4.78	6.33	1471.
400	3.97	34.01	397	27.03	107.4	5.91	10.34	1472.
500	3.79	34.10	496	27.12	99.8	6.95	15.10	1473.
600	3.66	34.16	595	27.18	94.5	7.93	20.56	1474.
800	3.24	34.27	793	27.31	83.4	9.69	33.13	1476.
1000	2.94	34.36	990	27.40	75.4	11.28	47.66	1478.
1200	2.64	34.42	1188	27.48	68.2	12.72	63.74	1480.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PRESSURE, DB
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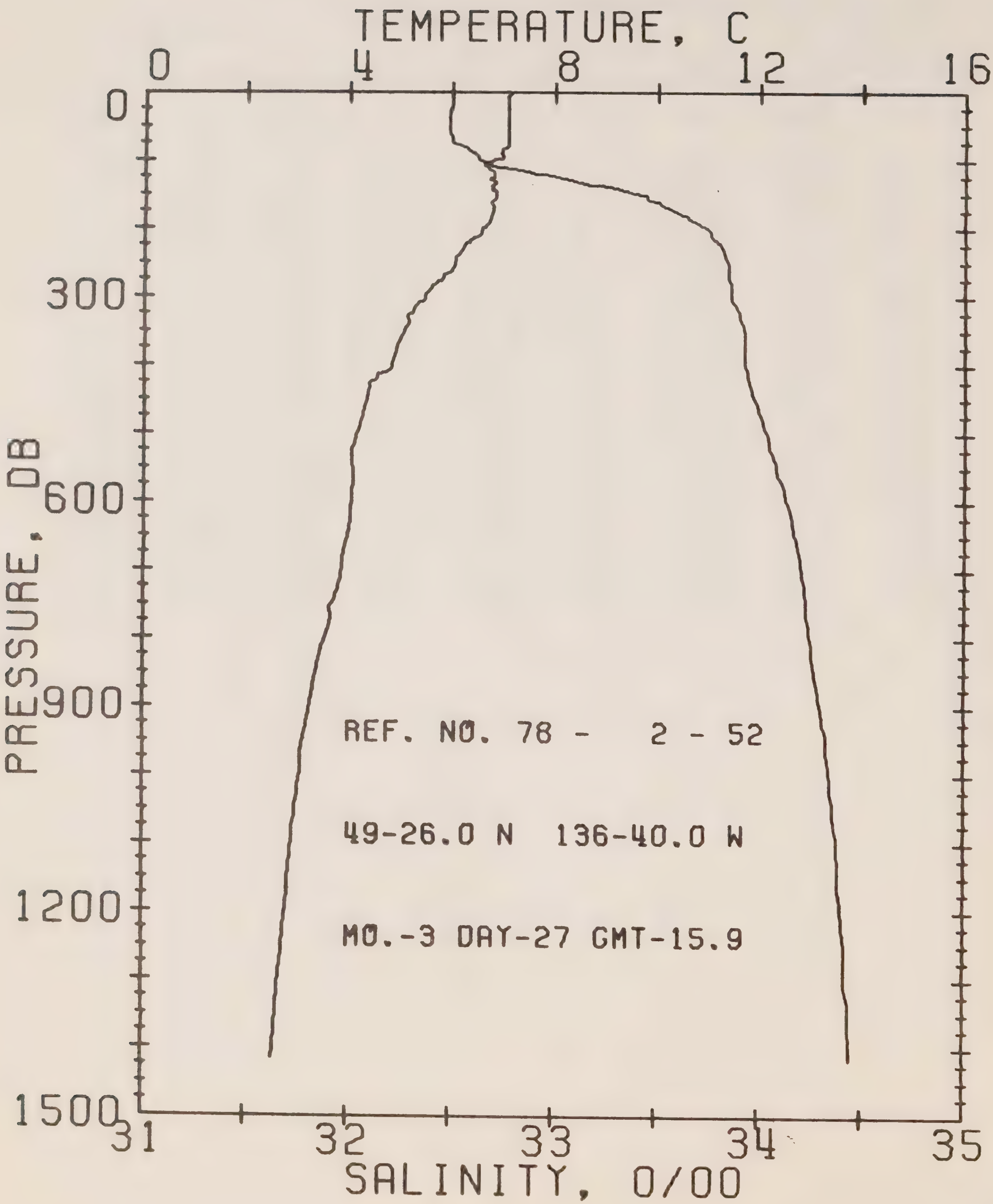
1200
1500
REF. NO. 78 - 2 - 51
49-34.0 N 138-40.0 W
MO.-3 DAY-27 GMT-8.1
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 51 DATE 27/ 3/78 STATION 10
POSITION 49-34.0N, 138-40.0W GMT 8.1
RESULTS OF STP CAST 206 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.18	32.63	0	25.55	244.0	0.0	0.0	1477.
10	7.19	32.67	10	25.58	241.4	0.24	0.01	1477.
20	7.19	32.70	20	25.61	239.4	0.48	0.05	1477.
30	7.17	32.71	30	25.62	238.7	0.72	0.11	1477.
50	6.85	32.74	50	25.69	232.4	1.20	0.30	1476.
75	6.73	32.78	75	25.73	228.0	1.77	0.67	1476.
100	6.61	32.94	99	25.87	215.3	2.33	1.17	1476.
125	6.17	33.36	124	26.26	178.3	2.82	1.73	1476.
150	6.15	33.72	149	26.55	151.4	3.22	2.29	1476.
175	6.20	33.81	174	26.61	146.0	3.59	2.90	1477.
200	5.83	33.83	199	26.67	140.3	3.95	3.58	1476.
225	5.55	33.84	223	26.72	136.5	4.29	4.33	1475.
250	5.12	33.84	248	26.77	131.7	4.63	5.14	1474.
300	4.63	33.84	298	26.82	125.7	5.28	6.96	1473.
400	4.23	33.95	397	26.95	115.0	6.48	11.24	1473.
500	4.02	34.05	496	27.05	106.4	7.59	16.31	1474.
600	3.80	34.13	595	27.14	98.3	8.61	22.04	1475.
800	3.35	34.26	793	27.28	85.9	10.44	35.06	1476.
1000	3.00	34.35	990	27.39	76.6	12.07	49.93	1478.
1200	2.78	34.40	1188	27.45	71.2	13.54	66.41	1481.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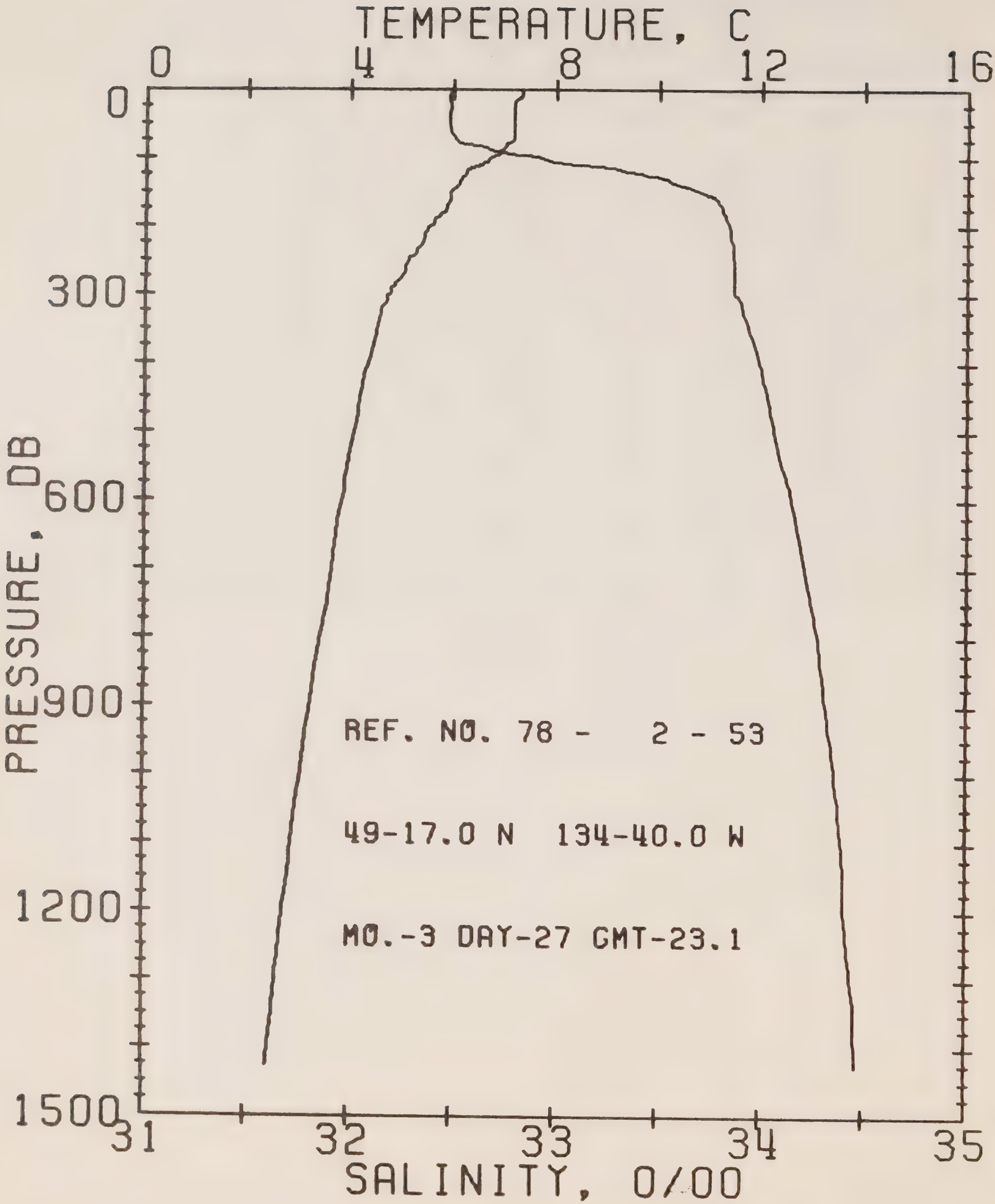
PRESSURE, DB
REF. NO. 78 - 2 - 52
49-26.0 N 136-40.0 W
MO.-3 DAY-27 GMT-15.9
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 52 DATE 27/ 3/78 STATION 9
POSITION 49-26.0N, 136-40.0W GMT 15.9
RESULTS OF STP CAST 219 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.07	32.50	0	25.47	252.2	0.0	0.0	1475.
10	7.10	32.50	10	25.46	253.0	0.25	0.01	1476.
20	7.10	32.50	20	25.46	253.2	0.51	0.05	1476.
30	7.10	32.49	30	25.46	254.0	0.76	0.12	1477.
50	7.10	32.49	50	25.46	254.3	1.27	0.32	1477.
75	7.10	32.52	75	25.48	252.4	1.90	0.73	1477.
100	6.77	32.64	99	25.62	239.5	2.52	1.28	1477.
125	6.81	33.04	124	25.93	210.5	3.09	1.93	1478.
150	6.87	33.43	149	26.22	182.6	3.58	2.61	1479.
175	6.78	33.59	174	26.36	169.6	4.02	3.34	1479.
200	6.58	33.74	199	26.51	156.4	4.43	4.12	1479.
225	6.23	33.81	223	26.61	147.1	4.81	4.95	1478.
250	6.05	33.84	248	26.66	142.9	5.17	5.82	1478.
300	5.46	33.86	298	26.74	134.7	5.86	7.77	1476.
400	4.83	33.93	397	26.87	123.2	7.13	12.28	1475.
500	4.15	34.03	496	27.03	108.7	8.28	17.55	1474.
600	4.04	34.13	595	27.12	101.0	9.33	23.41	1476.
800	3.53	34.24	793	27.26	88.8	11.22	36.85	1477.
1000	3.05	34.34	990	27.38	77.4	12.87	51.92	1478.
1200	2.79	34.40	1188	27.45	71.4	14.35	68.51	1481.



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600
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1200
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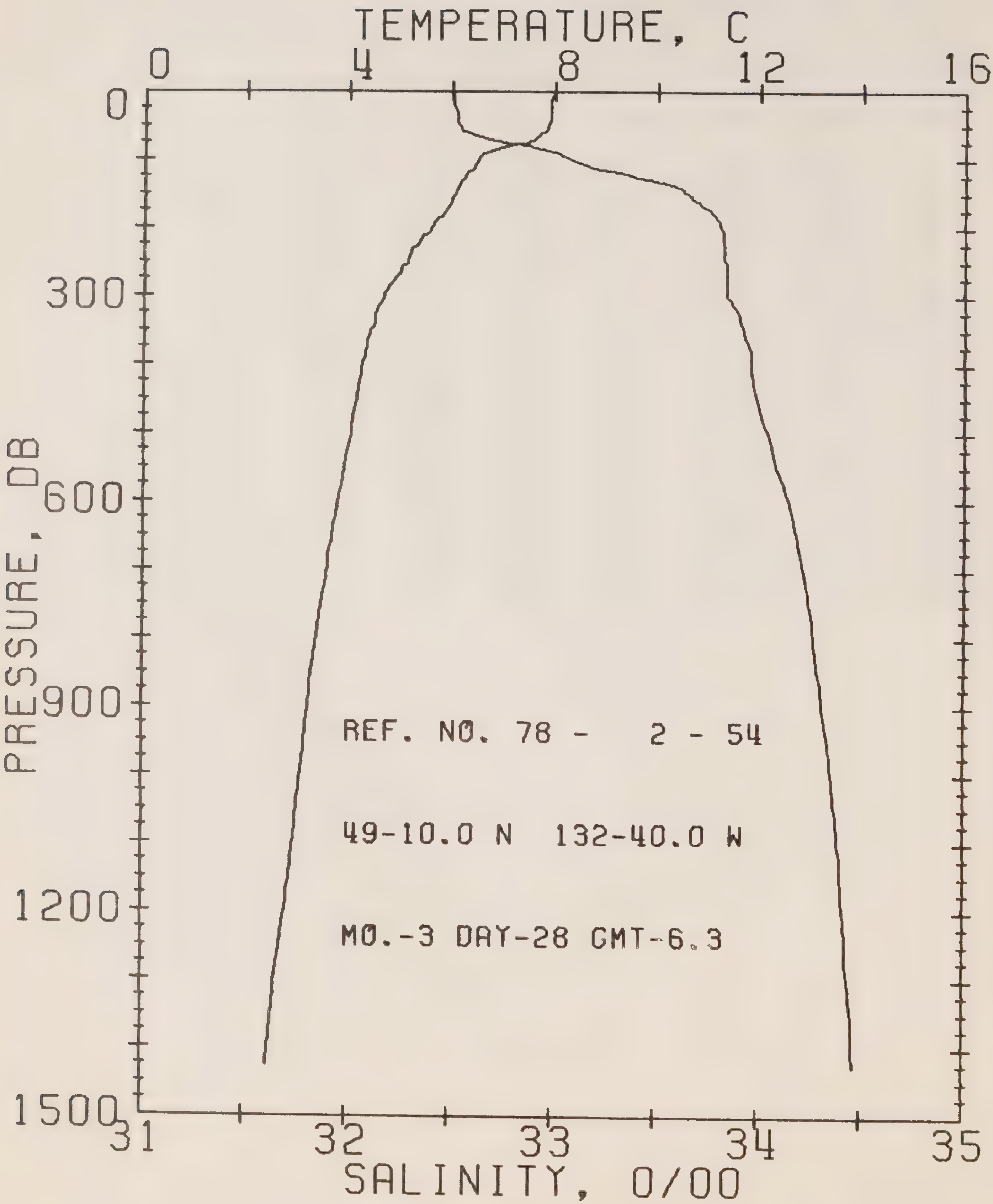
PRESSURE, DB
REF. NO. 78 - 2 - 53
49-17.0 N 134-40.0 W
MO.-3 DAY-27 GMT-23.1
31
32
33
34
35
SALINITY, O/OO

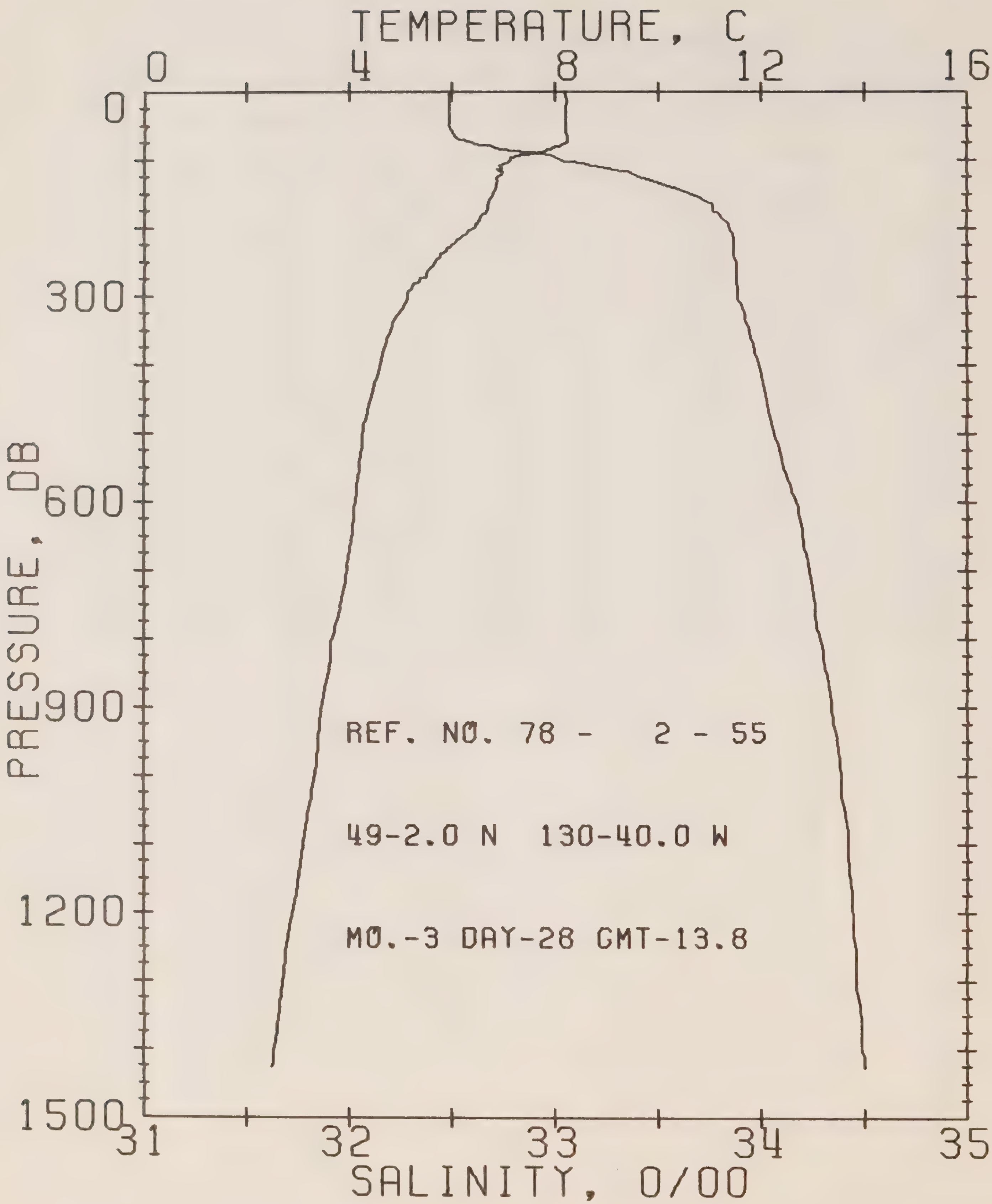
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 53 DATE 27/ 3/78 STATION 8
POSITION 49-17.0N, 134-40.0W GMT 23.1
RESULTS OF STP CAST 201 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.34	32.49	0	25.42	256.5	0.0	0.0	1477.
10	7.32	32.49	10	25.42	256.8	0.26	0.01	1477.
20	7.19	32.48	20	25.44	255.5	0.51	0.05	1477.
30	7.17	32.49	30	25.45	254.9	0.77	0.12	1477.
50	7.18	32.48	50	25.44	256.0	1.28	0.33	1477.
75	7.13	32.51	75	25.47	253.2	1.92	0.73	1478.
100	6.74	32.92	99	25.84	218.2	2.51	1.26	1477.
125	6.21	33.45	124	26.33	172.4	3.00	1.82	1476.
150	5.96	33.71	149	26.56	150.2	3.40	2.33	1476.
175	5.85	33.81	174	26.66	141.8	3.77	2.98	1476.
200	5.55	33.84	199	26.72	136.2	4.11	3.65	1475.
225	5.40	33.86	223	26.75	133.3	4.45	4.27	1475.
250	5.14	33.86	248	26.78	130.1	4.78	5.17	1474.
300	4.76	33.87	298	26.83	125.9	5.42	6.95	1473.
400	4.34	33.99	397	26.97	113.3	6.61	11.19	1473.
500	4.07	34.06	496	27.06	105.8	7.70	15.19	1474.
600	3.84	34.15	595	27.15	97.6	8.72	21.89	1475.
800	3.43	34.28	793	27.29	85.2	10.54	34.90	1477.
1000	3.05	34.36	990	27.39	76.2	12.16	49.64	1478.
1200	2.72	34.41	1188	27.46	70.0	13.61	65.88	1480.


TEMPERATURE, C
0
4
8
12
16
PRESSURE, DB
0
300
600
900
1200
1500
REF. NO. 78 - 2 - 54
49-10.0 N 132-40.0 W
MO.-3 DAY-28 GMT-6.3
31
32
33
34
35
SALINITY, O/OO

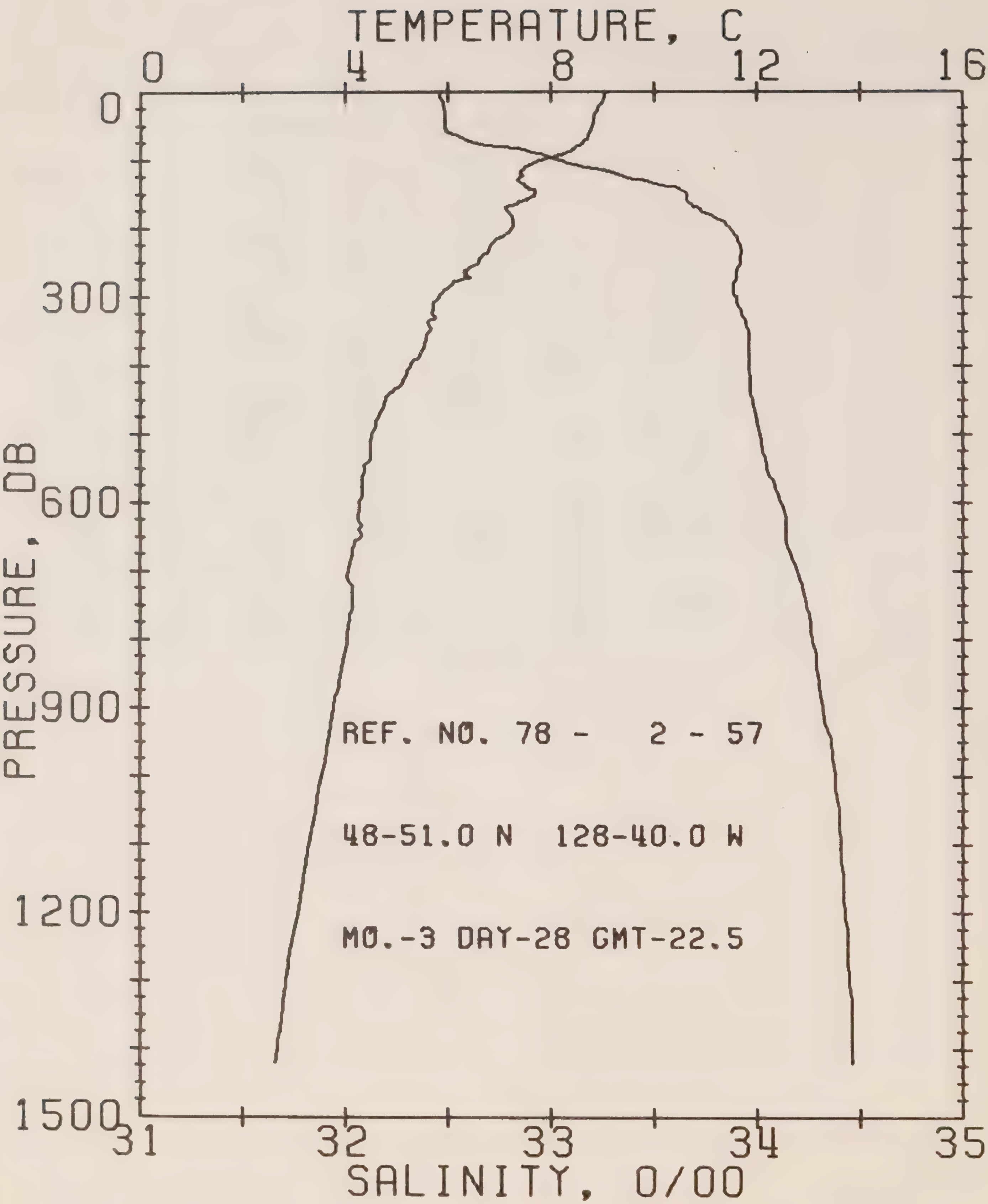
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 54 DATE 28/ 3/78 STATION 7
POSITION 49-10.0N, 132-40.0W GMT 5.3
RESULTS OF STP CAST 205 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	8.01	32.51	0	25.34	264.0	0.0	0.0	1480.
10	7.94	32.51	10	25.35	263.5	0.26	0.01	1480.
20	7.93	32.51	20	25.36	263.5	0.53	0.05	1480.
30	7.92	32.52	30	25.36	262.7	0.79	0.12	1480.
50	7.88	32.53	50	25.38	261.4	1.31	0.33	1480.
75	7.44	32.78	75	25.64	237.5	1.95	0.74	1479.
100	6.52	33.08	99	25.99	203.7	2.49	1.22	1476.
125	6.23	33.40	124	26.29	176.4	2.97	1.76	1476.
150	6.05	33.65	149	26.50	156.0	3.38	2.34	1476.
175	5.88	33.76	174	26.61	146.0	3.76	2.96	1476.
200	5.59	33.81	199	26.69	138.9	4.11	3.64	1475.
225	5.33	33.83	223	26.73	134.6	4.45	4.38	1474.
250	5.15	33.83	248	26.76	132.5	4.78	5.19	1474.
300	4.68	33.84	298	26.82	127.2	5.43	7.00	1473.
400	4.26	33.96	397	26.96	114.6	6.62	11.24	1473.
500	4.04	34.04	496	27.04	107.1	7.74	16.35	1474.
600	3.80	34.15	595	27.15	97.4	8.76	22.09	1475.
800	3.38	34.27	793	27.29	85.4	10.58	35.01	1476.
1000	3.09	34.35	990	27.39	77.0	12.20	49.85	1479.
1200	2.79	34.41	1188	27.46	70.5	13.67	66.31	1481.


TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NØ. 78 - 2 - 55
49-2.0 N 130-40.0 W
MØ.-3 DAY-28 GMT-13.8
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 55 DATE 29/ 3/78 STATION 6
POSITION 49- 2.0N, 130-40.0W GMT 13.8
RESULTS OF STP CAST 202 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	8.20	32.49	0	25.30	268.1	0.0	0.0	1480.
10	8.23	32.49	10	25.30	268.9	0.27	0.01	1481.
20	8.22	32.49	20	25.30	269.0	0.54	0.05	1481.
30	8.22	32.49	30	25.30	269.1	0.81	0.12	1481.
50	8.22	32.49	50	25.30	269.4	1.34	0.34	1481.
75	8.20	32.60	75	25.39	261.1	2.01	0.77	1482.
100	7.13	33.02	99	25.87	215.5	2.61	1.29	1479.
125	6.89	33.42	124	26.21	183.3	3.10	1.86	1479.
150	6.79	33.66	149	26.42	164.4	3.53	2.46	1479.
175	6.65	33.77	174	26.53	154.4	3.93	3.12	1479.
200	6.39	33.84	199	26.61	146.2	4.30	3.83	1478.
225	5.98	33.87	223	26.69	139.5	4.66	4.61	1477.
250	5.68	33.88	248	26.73	135.4	5.00	5.44	1476.
300	5.11	33.89	298	26.81	128.4	5.66	7.28	1475.
400	4.59	33.99	397	26.94	116.1	6.88	11.62	1475.
500	4.25	34.06	496	27.04	107.7	8.00	16.74	1475.
600	4.10	34.17	595	27.14	99.1	9.03	22.55	1476.
800	3.66	34.28	793	27.28	87.1	10.90	35.82	1478.
1000	3.31	34.39	991	27.39	77.0	12.53	50.77	1479.
1200	2.89	34.44	1188	27.48	69.5	14.00	67.14	1481.


TEMPERATURE, C
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12
16
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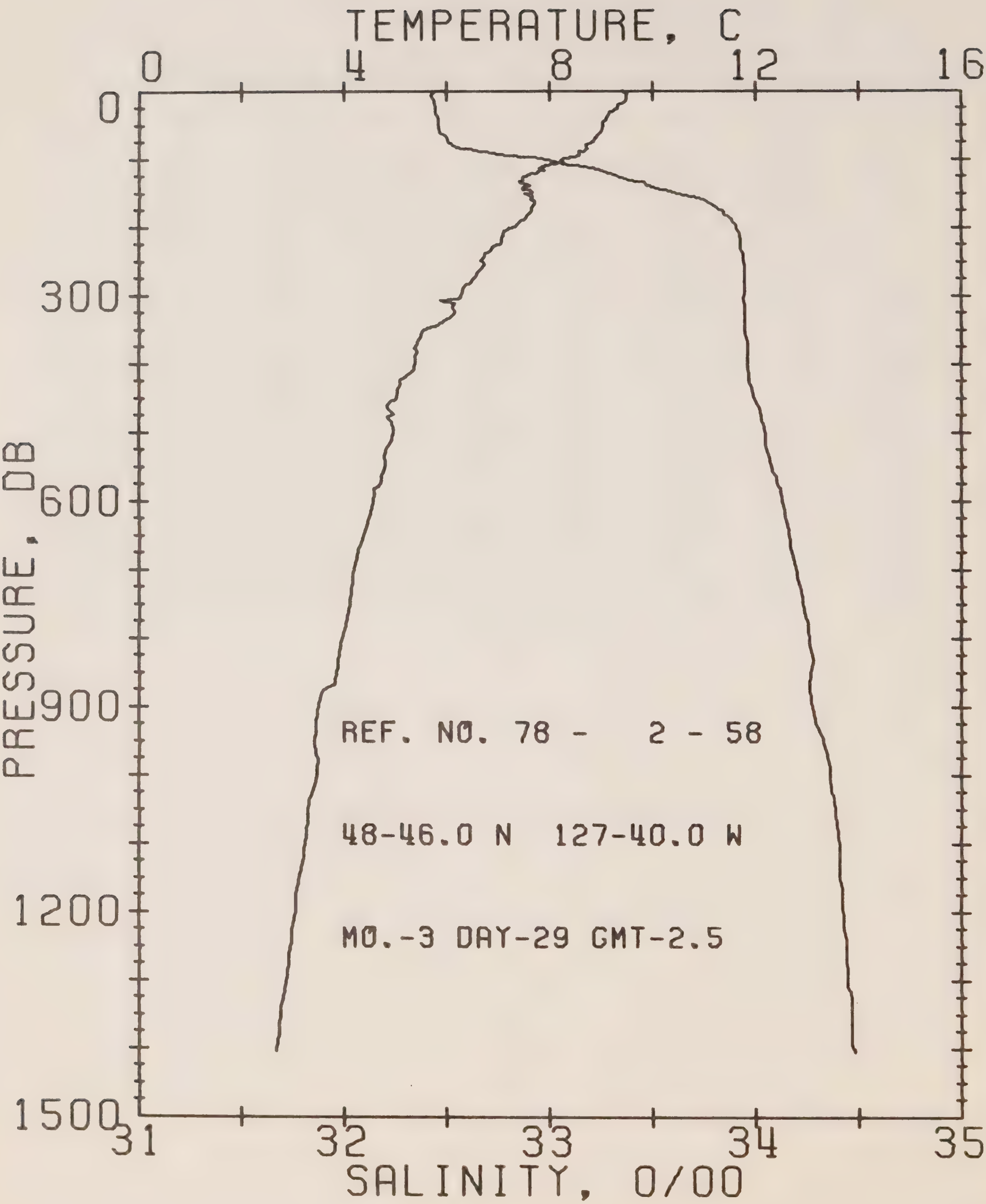
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 2 - 57
48-51.0 N 128-40.0 W
MO.-3 DAY-28 GMT-22.5
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 57 DATE 28/ 3/78 STATION 5
POSITION 48-51.0N, 128-40.0W GMT 22.5
RESULTS OF STP CAST 236 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	9.03	32.46	0	25.15	282.4	0.0	0.0	1484.
10	9.02	32.47	10	25.16	282.0	0.28	0.01	1484.
20	8.93	32.48	20	25.18	279.9	0.56	0.06	1484.
30	8.87	32.49	30	25.20	278.5	0.84	0.13	1483.
50	8.80	32.49	50	25.21	277.8	1.40	0.36	1484.
75	8.61	32.64	75	25.36	263.9	2.08	0.79	1483.
100	7.85	33.04	99	25.78	224.1	2.69	1.33	1481.
125	7.38	33.37	124	26.11	193.5	3.21	1.92	1480.
150	7.69	33.66	149	26.29	176.6	3.66	2.56	1482.
175	7.17	33.74	174	26.43	163.8	4.09	3.27	1481.
200	7.24	33.87	199	26.52	155.7	4.49	4.03	1482.
225	6.83	33.92	223	26.62	146.7	4.87	4.85	1481.
250	6.59	33.92	248	26.65	143.8	5.23	5.72	1480.
300	5.84	33.90	298	26.73	136.4	5.93	7.69	1478.
400	5.24	33.96	397	26.85	125.9	7.24	12.35	1477.
500	4.52	34.01	496	26.97	114.4	8.44	17.85	1476.
600	4.25	34.12	595	27.08	104.7	9.54	24.01	1477.
800	4.02	34.27	793	27.23	92.6	11.51	38.03	1479.
1000	3.51	34.38	991	27.37	80.0	13.24	53.81	1480.
1200	3.07	34.43	1188	27.45	72.5	14.76	70.85	1482.


TEMPERATURE, C
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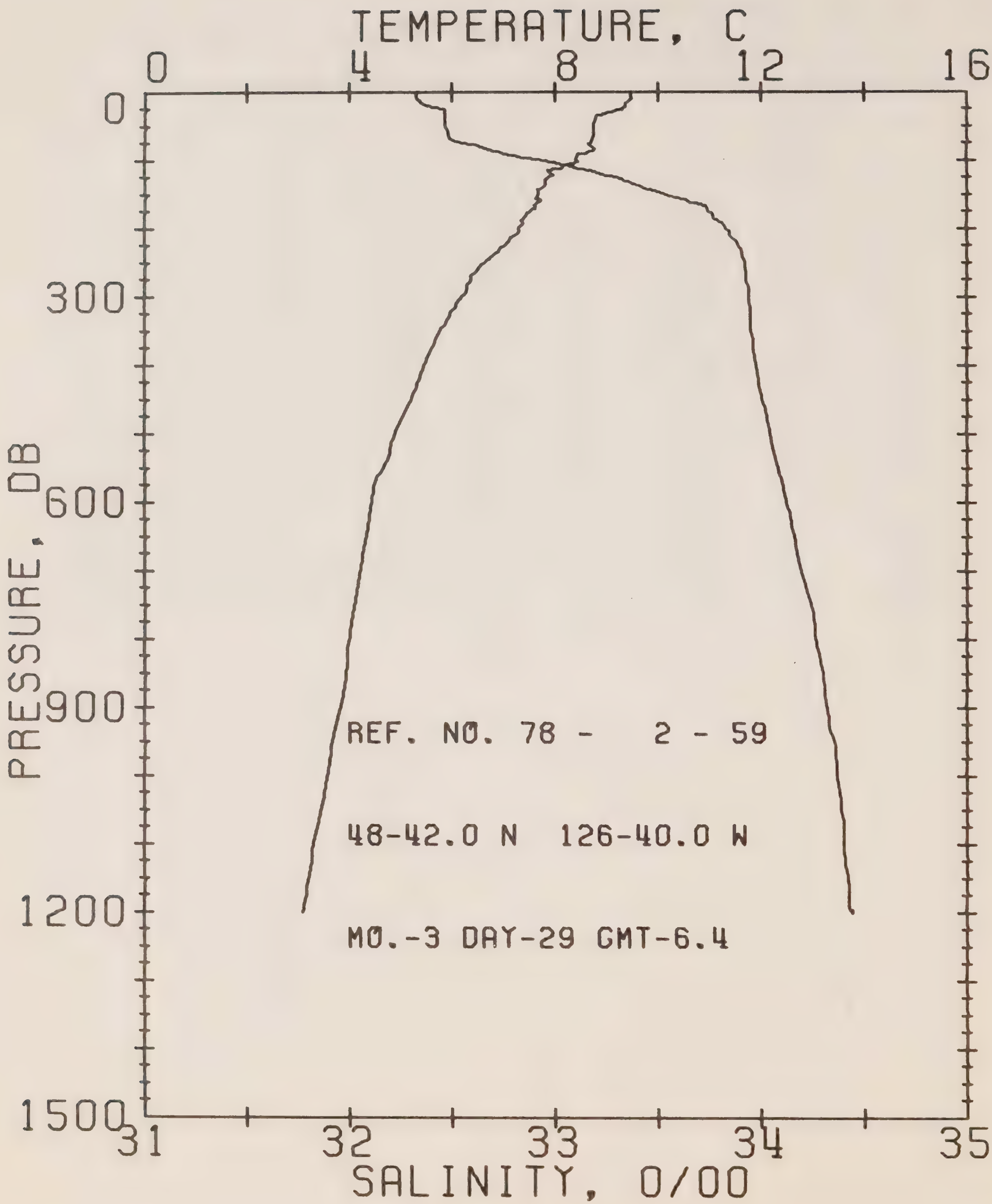
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 2 - 58
48-46.0 N 127-40.0 W
MO.-3 DAY-29 GMT-2.5
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 58 DATE 29/ 3/78 STATION 4
POSITION 48-40.0N, 127-40.0W GMT 2.5
RESULTS OF STP CAST , 254 POINTS TAKEN FROM ANALOG TRACE

PRESS.	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	9.40	32.44	0	25.08	289.4	0.0	0.0	1485.
10	9.48	32.43	10	25.06	291.7	0.29	0.01	1485.
20	9.33	32.44	20	25.09	288.9	0.58	0.06	1485.
30	9.24	32.45	30	25.11	286.9	0.87	0.13	1485.
50	9.04	32.46	50	25.15	283.6	1.44	0.36	1484.
75	8.84	32.51	75	25.22	277.0	2.14	0.81	1484.
100	8.23	32.99	99	25.69	233.2	2.77	1.39	1483.
125	7.93	33.34	124	26.06	198.0	3.33	2.01	1481.
150	7.60	33.62	149	26.27	178.2	3.80	2.65	1482.
175	7.64	33.83	174	26.44	163.2	4.22	3.36	1483.
200	7.29	33.91	199	26.54	153.3	4.62	4.12	1482.
225	6.97	33.93	223	26.60	147.8	4.99	4.93	1481.
250	6.71	33.94	248	26.65	143.9	5.35	5.81	1481.
300	6.27	33.95	298	26.71	138.1	6.06	7.78	1480.
400	5.38	33.96	397	26.83	127.5	7.38	12.47	1478.
500	4.94	34.04	496	26.95	117.0	8.59	18.01	1478.
600	4.57	34.13	595	27.06	107.4	9.71	24.31	1478.
800	3.95	34.26	793	27.22	92.5	11.70	38.44	1479.
1000	3.40	34.36	991	27.36	80.7	13.43	54.28	1480.
1200	3.02	34.42	1188	27.45	72.5	14.95	71.25	1482.


TEMPERATURE, C
0
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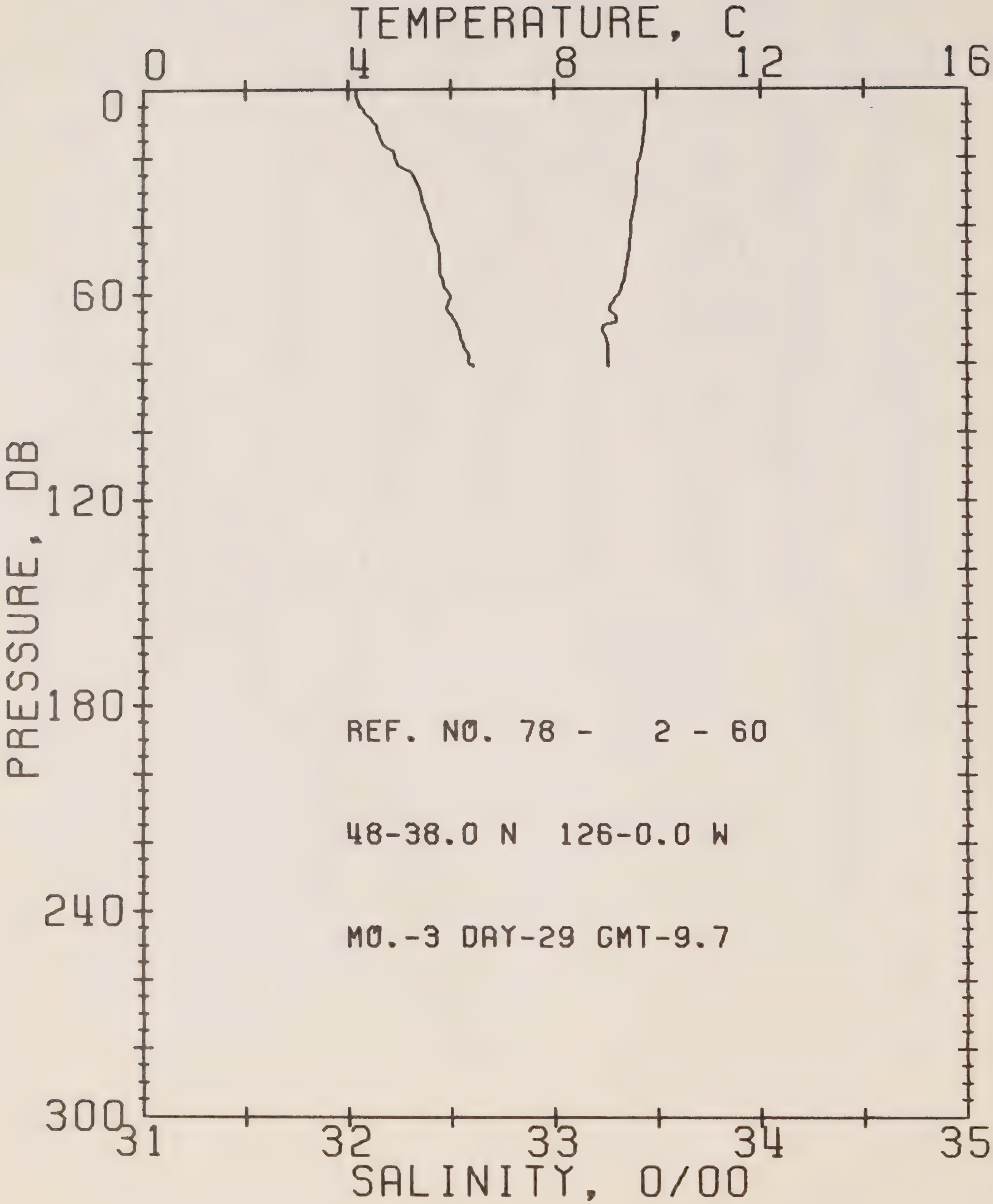
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 2 - 59
48-42.0 N 126-40.0 W
MO.-3 DAY-29 GMT-6.4
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 59 DATE 29/ 3/78 STATION 3
POSITION 48-42.0N, 126-40.0W GMT 5.4
RESULTS OF STD CAST , 206 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	S VEL
0	9.47	32.33	0	24.98	298.6	0.0	0.0	[illegible]
10	9.43	32.33	10	24.98	299.2	0.30	0.02	[illegible]
20	9.36	32.38	20	25.04	293.8	0.60	[illegible]	1485.
30	9.12	32.47	30	25.14	283.6	0.88	0.14	1484.
50	8.75	32.47	50	25.20	278.6	1.44	0.36	1483.
75	8.68	32.57	75	25.29	270.1	2.13	0.80	1484.
100	8.40	32.94	99	25.62	239.3	2.78	1.37	1483.
125	7.87	33.30	124	25.98	205.4	3.33	2.01	1482.
150	7.65	33.53	149	26.19	185.8	3.82	2.69	1482.
175	7.50	33.74	174	26.38	166.0	4.26	3.42	1482.
200	7.31	33.83	199	26.48	159.4	4.67	4.20	1482.
225	7.00	33.89	223	26.57	151.2	5.06	5.04	1481.
250	6.62	33.92	248	26.64	144.3	5.43	5.93	1480.
300	6.13	33.94	298	26.72	137.8	6.13	7.50	1479.
400	5.44	33.97	397	26.84	127.1	7.45	12.61	1477.
500	4.87	34.04	496	26.96	116.3	8.67	18.19	1477.
600	4.42	34.12	595	27.07	106.0	9.78	24.41	1477.
800	3.98	34.26	793	27.23	92.3	11.74	37.46	1477.
1000	3.55	34.37	991	27.35	81.1	13.49	54.72	1481.
1200	3.08	34.44	1188	27.46	71.9	15.02	71.43	1482.


TEMPERATURE, C
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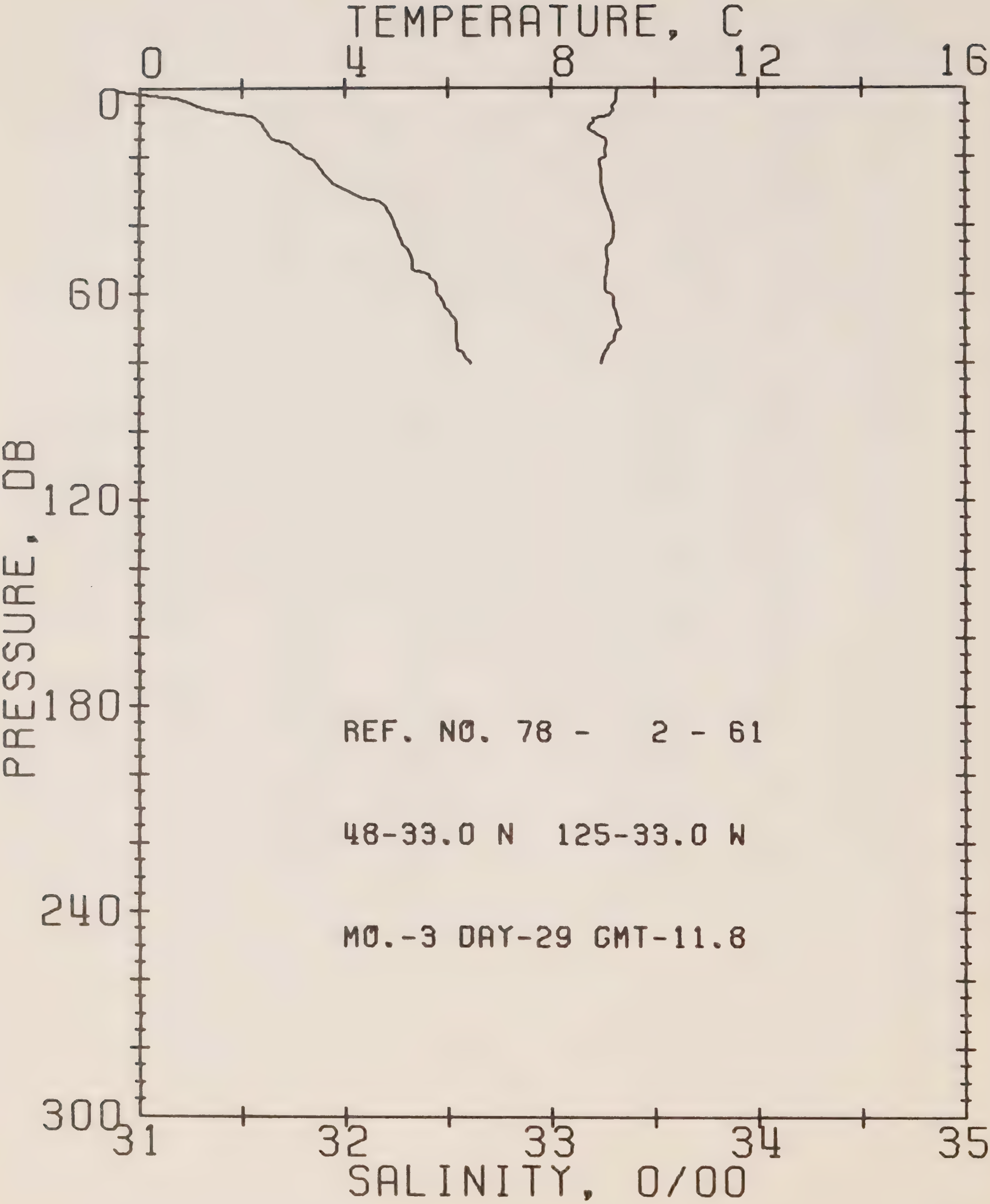
12
16
0
60
120
180
240
300
PRESSURE, DB
REF. NO. 78 - 2 - 60
48-38.0 N 126-0.0 W
MO.-3 DAY-29 GMT-9.7
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 60 DATE 29/ 3/78 STATION 2
POSITION 48-38.0N, 126- 0.0W GMT 9.7
RESULTS OF STP CAST 43 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	9.71	32.04	0	24.72	328.8	0.0	0.0	1486.
10	9.77	32.13	10	24.77	318.7	0.32	0.02	1486.
20	9.63	32.23	20	24.87	309.8	0.64	0.06	1486.
30	9.60	32.35	30	24.97	299.9	0.94	0.14	1486.
50	9.43	32.45	50	25.08	290.2	1.53	0.38	1486.
75	9.04	32.56	75	25.23	276.3	2.24	0.53	1485.

DEPTH	TEMP	SAL	DEPTH	TEMP	SAL
0.	9.71	32.04	51.	9.42	32.45
1.	9.73	32.04	54.	9.38	32.45
3.	9.78	32.04	56.	9.36	32.46
5.	9.78	32.06	58.	9.32	32.47
8.	9.78	32.10	59.	9.31	32.48
11.	9.77	32.14	61.	9.21	32.50
12.	9.77	32.14	63.	9.11	32.49
16.	9.73	32.17	64.	9.06	32.48
18.	9.70	32.22	65.	9.13	32.49
20.	9.68	32.23	66.	9.17	32.50
22.	9.62	32.24	67.	9.20	32.51
24.	9.62	32.31	68.	9.19	32.52
27.	9.61	32.33	69.	8.95	32.53
29.	9.61	32.34	71.	8.94	32.54
32.	9.59	32.36	73.	9.02	32.55
33.	9.58	32.36	76.	9.05	32.57
36.	9.54	32.38	77.	9.05	32.58
37.	9.53	32.39	78.	9.05	32.59
40.	9.49	32.40	79.	9.05	32.59
42.	9.48	32.41	80.	9.05	32.59
46.	9.45	32.44	81.	9.04	32.61
50.	9.43	32.45			


TEMPERATURE, C
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12
16
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60
120
180
240
300
PRESSURE, DB
REF. NO. 78 - 2 - 61
48-33.0 N 125-33.0 W
MO.-3 DAY-29 GMT-11.8
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 2- 61 DATE 29/ 3/78 STATION 1
POSITION 48-33.0N, 125-33.0W GMT 11.8
RESULTS OF STP CAST 57 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	9.27	30.88	0	23.88	403.3	0.0	0.0	1482.
10	8.84	31.59	10	24.50	344.6	0.37	0.02	1482.
20	9.03	31.81	20	24.64	331.2	0.71	0.07	1483.
30	8.98	32.02	30	24.82	315.0	1.03	0.15	1483.
50	9.07	32.32	50	25.04	294.1	1.64	0.40	1484.
75	9.10	32.55	75	25.21	278.1	2.35	0.85	1485.

DEPTH	TEMP	SAL
0.	9.27	30.88
1.	9.27	30.91
2.	9.26	31.06
3.	9.26	31.18
4.	9.25	31.24
5.	9.20	31.29
6.	9.16	31.33
7.	9.19	31.39
8.	9.13	31.55
9.	8.80	31.57
10.	8.84	31.59
11.	8.75	31.60
12.	8.71	31.61
15.	9.05	31.65
16.	9.07	31.73
17.	9.07	31.74
18.	9.05	31.77
20.	9.03	31.81
21.	8.94	31.85
22.	8.92	31.86
25.	8.95	31.90
28.	8.96	31.95
30.	8.98	32.02
32.	9.01	32.09
33.	9.03	32.17
35.	9.09	32.20
36.	9.12	32.21
37.	9.15	32.22
40.	9.19	32.24

DEPTH	TEMP	SAL
42.	9.19	32.25
43.	9.20	32.26
44.	9.19	32.27
46.	9.09	32.29
47.	9.07	32.30
49.	9.07	32.32
51.	9.08	32.33
53.	9.07	32.33
54.	9.06	32.40
55.	9.04	32.43
57.	9.04	32.44
59.	9.03	32.45
60.	9.14	32.45
61.	9.21	32.46
64.	9.20	32.49
65.	9.25	32.51
68.	9.27	32.54
69.	9.30	32.54
70.	9.33	32.54
71.	9.24	32.54
73.	9.23	32.54
74.	9.16	32.54
75.	9.10	32.55
76.	9.09	32.55
77.	9.05	32.57
78.	9.01	32.58
79.	8.99	32.59
80.	8.95	32.61

Surface Salinity and Temperature Observations

(P-78-2)

SURFACE SALINITY AND TEMPERATURE OBSERVATIONS
CRUISE REFERENCE NUMBER 78- 2

DATE/TIME				SALINITY	TEMP	LONGITUDE
YR	MO	DY	GMT	0/00	C	WEST
78	2	11	0	29.853	8.3	123-30
78	2	11	125	30.291	8.0	124- 0
78	2	11	1350	32.484 b	7.9	128-40
78	2	12	1910	32.602	6.6	138-40
78	2	13	950	32.744	5.3	142-40
78	2	13	1505	32.783	5.3	143-40
78	2	14	0	32.751	5.2	ON STATION
78	2	15	0	32.775	5.0	ON STATION
78	2	16	0	32.779	5.1	ON STATION
78	2	17	0	32.788	5.1	ON STATION
78	2	19	0	32.789	5.0	ON STATION
78	2	20	0	32.787	5.1	ON STATION
78	2	21	0	32.788	5.0	ON STATION
78	2	23	0	32.795	5.0	ON STATION
78	2	24	0	32.810	5.0	ON STATION
78	2	25	0	32.799	5.1	ON STATION
78	2	26	0	32.798	5.1	ON STATION
78	2	27	0	32.807	5.0	ON STATION
78	2	28	0	32.806	5.3	ON STATION
78	3	1	0	32.831	4.9	ON STATION
78	3	2	0	32.812	5.1	ON STATION
78	3	3	0	32.809	5.3	ON STATION
78	3	4	0	32.807	5.3	ON STATION
78	3	5	0	32.811	5.1	ON STATION
78	3	6	0	32.813	5.0	ON STATION
78	3	7	0	32.808	5.0	ON STATION
78	3	8	0	32.819	4.9	ON STATION
78	3	9	0	32.824	4.9	ON STATION
78	3	10	0	32.824	5.0	ON STATION
78	3	11	0	32.799	5.1	ON STATION
78	3	12	0	32.808	5.1	ON STATION
78	3	13	0	32.823	5.0	ON STATION
78	3	14	0	32.815	5.0	ON STATION
78	3	15	0	32.806	5.0	ON STATION
78	3	16	0	32.805	5.1	ON STATION
78	3	17	0	32.806	5.0	ON STATION
78	3	18	0	32.864	5.1	ON STATION
78	3	19	0	32.810	5.1	ON STATION
78	3	20	0	32.806	5.1	ON STATION
78	3	20	2100	32.808		143-40
78	3	21	0	32.780		142-45
78	3	21	300	32.758		141-52
78	3	21	1800	32.798		143- 6
78	3	21	2100	32.797		143-18

SURFACE SALINITY AND TEMPERATURE OBSERVATIONS
CRUISE REFERENCE NUMBER 78- 2

DATE/TIME				SALINITY	TEMP	LONGITUDE
YR	MO	DY	GMT	0/00	C	WEST
78	3	22	0	32.795		143-29
78	3	22	300	32.801		143-42
78	3	22	600	32.789		143-53
78	3	23	0	32.798	5.2	ON STATION
78	3	24	0	32.806	5.3	ON STATION
78	3	25	0	32.803	5.2	ON STATION
78	3	26	0	32.811	5.2	ON STATION
78	3	26	1824	32.762	5.6	142-40
78	3	27	120	32.765	5.7	140-40
78	3	27	805	32.706	6.9	138-40
78	3	27	1554	32.519	6.9	136-40
78	3	27	2305	32.512	7.1	134-40
78	3	28	620	32.541	7.8	132-40
78	3	28	1345	32.501	8.0	130-40
78	3	28	2230	32.482	8.8	128-40
78	3	29	230	32.430	9.3	127-40
78	3	29	626	32.345	9.3	126-40
78	3	29	941	32.601	9.6	126- 0
78	3	29	1145	30.880	9.0	125-33

b DENOTES SALINITY SAMPLE TAKEN FROM A
BUCKET. ALL OTHER SAMPLES TAKEN FROM
THE SEAWATER LOOP

List of Omissions from Data

Hydrographic Data:

Consec. #	Depth (m)	Temp.	Sal.	O_2	Notes 1.	Notes 2.	Notes 3.	Comments
22	4147			*	*			
	4157			*	*			
	4157		*		*			
32	3308		*		*			
	3308			*	*			
	3846		*		*			
	3933			*		*		
39	3953		*			*		Mistrip
	3953			*		*		Mistrip
	4136		*		*			
44	3883		*			*		Mistrip
	3883			*		*		Mistrip

Notes (MacNeill, 1977):

1. The data is suspect becuase of a reversal of gradient by >.01 $^{o}/oo$ (salinity) or >.08 ml/ℓ (oxygen).

2. The data is deleted because of very irregular data values (usually a mistripping or leaking bottle if both oxygen and salinity are irregular).

3. The data is deleted because duplicate samples at a depth were not within .01 $^{o}/oo$ (salinity) or .08 ml/ℓ (oxygen).

STP Data:

Consecutive Number	Comments
37	Temperature only; salinity offscale.

Pacific Marine Science Report 78-20

OCEANOGRAPHIC OBSERVATIONS AT OCEAN STATION P
24 March - 10 May 1978
Volume 90

by

Seakem Oceanography Ltd.

INSTITUTE OF OCEAN SCIENCES, PATRICIA BAY
Sidney, B.C.

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Pacific Marine Science Report 78-20

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Sidney, B.C.

1978

This is a manuscript which has received only limited circulation. On citing this report in a bibliography, the title should be followed by the words "UNPUBLISHED MANUSCRIPT" which is in accordance with accepted bibliographic custom.

ABSTRACT

Physical, chemical and biological oceanographic observations are made from the weathership at Ocean Weather Station Papa, and between Esquimalt and Station Papa, on a routine continuing basis. Physical oceanography data only are shown, including surface observations and profiles obtained with bottle casts and conductivity-temperature-pressure instruments.

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INTRODUCTION

Canadian operation of Ocean Weather Station P (Latitude 50°00' N, Longitude 145°00' W) was inaugurated in December, 1950. The station is occupied primarily to make meteorological observations of the surface and upper air and to provide an air-sea rescue service. The station is manned by two vessels operated by the Marine Services Branch of the Ministry of Transport. They are the CCGS Vancouver and the CCGS Quadra. Each ship remains on station for a period of six weeks, and is then relieved by the alternate ship, thus maintaining a continuous watch.

Bathythermograph observations have been made at Station P since July 1952. A program of more extensive oceanographic observations commenced in August 1956. This was extended in April 1959, by the addition of a series of oceanographic stations along the route to and from Station P and Swiftsure Bank. These stations are known as Line P stations. The number of stations on Line P has been increased twice and now consists of twelve stations (Fig. 1). Bathythermograph observations and surface salinity sample collections, in addition to being made on Line P oceanographic stations, are also made at odd meridians at 40', i.e. 139°40' W, 141°40' W, etc. These stations are known as Line P BT stations. Data observed prior to 1968 have been indexed by Collins et al (1969).

The present record includes hydrographic, continuously sampled STD and surface salinity and temperature data collected from the CCGS Quadra during the period 24 March to 10 May 1978.

All physical oceanographic data have been stored by the Canadian Oceanographic Data Centre (CODC), 615 Booth Street, Ottawa, Ontario, Canada. Requests for these data should be directed to CODC.

Biological and productivity data are published in the Manuscript Report series of the Fisheries Research Board of Canada (FRB), Pacific Biological Station, Nanaimo, British Columbia, Canada. Requests for these data should be directed to FRB.

Marine geochemical data are for the Ocean Chemistry Group, Ocean and Aquatic Sciences, Environment Canada, Institute of Ocean Sciences, P.O. Box 6000, Sidney, British Columbia, Canada, V8L 4B2.

PROGRAM OF OBSERVATION FROM CCGS QUADRA, 24 MARCH - 10 MAY 1978 (P-78-03) (CODC Ref. No. 15-78-003)

Oceanographic observations were made by Mr. T. Juhasz of Seakem Oceanography Ltd., Sidney, B.C.

En Route to Station P

Line P Stations 1, 9, 11 and 12 were occupied and an STD profile made to near bottom or 1500 metres. One hydrocast was made at Station 11 to 1500 metres. Rough weather cancelled work on Stations 4 and 5. Lack of time cancelled the second scheduled hydrocast.

Samples for nitrates, nutrients, alkalinity and total CO_2 were collected at all whole stations from the seawater loop. Loop salinities were collected at all whole and half stations. A bucket salinity sample was collected at Station 1. Surface bucket temperatures were taken at all whole and half stations.

No surface tarball tows were made since the tarball net was not aboard.

The thermosalinograph, surface temperature recorder and PCO_2 system were run continuously.

Mechanical BT's or XBT's were taken at all whole and half stations.

On Station P

The oceanographic program was carried out as follows:

Physical Oceanography:

1) Profiles for salinity, temperature and oxygen were obtained from 2 hydrocasts to 4200 metres and 4 hydrocasts to 1500 metres.

2) Nineteen STD profiles to 300 metres and nine to 1500 metres were obtained.

3) BT's were taken every 3 hours to coincide with meteorological observations and encoded and transmitted according to the IGOSS format. XBT's were taken on days of rough weather.

4) Salinity samples were collected daily at 0000 hrs GMT from the seawater loop.

5) Fifteen extra STD profiles were obtained to 300 metres from triangle grids set up by Cruise 15-77-006 as part of the MILE Program.

Marine Geochemistry:

1) Nutrient and salinity samples were collected daily at 0000 hrs GMT from the seawater loop. Two profiles for nutrients and one for tritium to 500 metres were taken. One bucket sample and one rainwater sample for tritium and 6 rainwater samples for Pb^{210} were collected.

2) Alkalinity and total CO_2 samples were collected every week from the seawater loop. One profile to 500 metres was taken as well as a profile to 4000 metres for alkalinity. Additional loop samples accompanied each seawater C-14 sample.

3) Twenty-four 2 litre and six 5 litre samples were taken for air CO_2 for Ocean Chemistry. Twelve 2 litre samples were collected for Scripps.

4) Six surface tarball tows were completed.

5) PCO_2 carboys were filled in duplicate every week.

6) Three samples each of seawater C-14, seawater C-13 and air C-13 were collected.

7) Two profiles to 1500 metres and a weekly surface sample were collected for particulate organic carbon.

8) Twelve hydrocarbon samples were collected (6 with an NBS sampler, 6 with a stainless steel bucket).

Biological Oceanography:

1) Twenty-six 150 metre vertical plankton hauls.

2) Six Secchi disc readings taken at local noon.

3) A weekly nitrate sample was taken from the seawater loop.

4) Two profiles to 75 metres for chlorophyll _a_ were obtained, as well as a weekly seawater loop sample taken in triplicate.

En Route from Station P

Line P Stations 12 to 1 were occupied and an STD profile made to near bottom. Two hydrocasts to 1500 metres were taken at Stations 12 and 9.

Samples for nutrients, nitrates, alkalinity and total CO_2 were collected from the seawater loop at all whole stations. Loop salinity samples were collected at all whole and half stations. Bucket salinity samples were collected at Stations 5 to 1. Surface bucket temperatures were taken at Stations 12 to 1.

No surface tarball tows were made.

The surface temperature recorder and thermosalinograph were run continuously. The PCO_2 system was run from Station P to Station 4.

Mechanical BT's or XBT's were taken at all whole and half stations.

Observations for Other Agencies

1) Marine mammal observations were made by the ship's officers for Mr. I. McAskie, Fisheries Research Board of Canada, Pacific Biological Station, Nanaimo, British Columbia, Canada.

2) Bird observations were made by the ship's officers for Dr. M. Myres, University of Alberta, Calgary, Alberta, Canada and Mr. J. Guiguet, Curator of Birds and Mammals, Provincial Museum, Department of Provincial Secretary and Travel Industry, Victoria, British Columbia, Canada.

3) Air CO_2 samples were taken weekly in duplicate for Scripps Institute of Oceanography, La Jolla, California, U.S.A.

Data were processed for publication by Ms. M. Sainsbury of Seakem Oceanography Ltd., Sidney, B.C.

OBSERVATIONAL PROCEDURES

Observations for salinity, oxygen and temperature from all hydrographic casts, including the surface, were obtained with Niskin water sample bottles equipped with either Richter and Wiese and/or Yoshino Keiki Co. reversing thermometers. Two protected thermometers were used on all bottles and one unprotected thermometer was used on each bottle at depths of 300 metres or greater. The accuracy of protected reversing thermometers is believed to be $\pm 0.02^{\circ}C$.

The daily surface water temperatures were measured from a bucket sample using a deck thermometer of $\pm 0.1^{\circ}C$ accuracy. The daily surface salinity samples were obtained from the seawater loop. When the seawater loop was not operational these samples were obtained with a bucket, and are indicated with a 'b' in this data record.

Salinity determinations were made aboard ship with either an Autolab Model 601 Mark III inductive salinometer or a Hytech Model 6220 lab salinometer. Accuracy using duplicate determinations is estimated to be $\pm 0.003\ ^{o}/oo$.

Depth determinations were made using the "depth difference" method described in the U.S.N. Hydrographic Office Publication No. 607 (1955). Depth estimates have an approximate accuracy of ±5 metres for depths less than 1000 metres, and ±0.5% of depth for depths greater than 1000 metres.

The dissolved oxygen analyses were done in shipboard laboratory by a modified Winkler method (Carpenter, 1955).

Line P engine intake continuous temperature on both ships was recorded by a Honeywell Electronik 15 Recorder. The temperature probe is at a depth of approximately 3 metres below the sea surface and the instrument accuracy is believed to be ±0.1°C.

Each ship is equipped with a Plessey Model 6600-T thermosalinograph which is used, on Line P, for continuous recording of surface temperatures and salinities from the ship's seawater loop. The temperature probe is mounted at the seawater loop intake (approximately 3 metres below the surface) and the salinity probe and recorder are situated in the dry lab. The accuracy of this instrument is believed to be ±0.1°C for temperature and ±0.1 ^{o}/oo for salinity.

STD profiles were taken with a Plessey Model 9006 STD system.

COMPUTATIONS

All hydrographic data were processed with the aid of an IBM 370 computer and a UNIVAC 1100 computer. Reversing thermometer temperature corrections, thermometric depth calculations and accepted depth from the "depth difference" method were computed. Extraneous thermometric depths caused by thermometer malfunctions were automatically edited and replaced. A Calcomp 565 Offline Plotter was used to plot temperature-salinity and temperature-oxygen diagrams, as well as plots of temperature, salinity and dissolved oxygen vs $\log_{10}$ depth. These plots were used to check the data for errors.

Missing hydrographic data were obtained using a weighted parabolas interpolation method (Reiniger and Ross, 1968). These data are indicated with an asterisk in this data record.

Data values which we suspect but which we have included in this data record are indicated with a plus. These data have been removed from punch card and magnetic tape records.

Analog records from the salinity-temperature-pressure instrument have been machine digitized, then replotted using the Calcomp plotter.

Digitization was continued until original and computer plotted traces were coincident. Temperature and salinity values were listed at standard pressure; integrals (depths, geopotential anomaly, and potential energy anomaly) were computed from the entire array of digitized data.

The headings for the data listings are explained as follows:

PRESS	is pressure (decibars)
TEMP	is temperature (degrees Celsius)
SAL	is salinity (parts per thousand)
DEPTH	is reported in metres
SIGMA-T	is specific gravity anomaly
SVA	is specific volume anomaly
THETA	is potential temperature (degrees Celsius)
SVA (THETA)	is potential specific volume anomaly
DELTA D	is geopotential anomaly (J/kg)

POT EN	is potential energy in units of 10^8 ergs/cm^2
OXY	is the concentration of dissolved oxygen expressed in millilitres per litre
SOUND	is the velocity of sound in m/sec

REFERENCES

Carpenter, J.H., 1965. The Chesapeake Bay Institute technique for the Winkler dissolved oxygen method. Limnol. and Oceanogr. 10, 141-143.

Collins, C.A., R.L. Tripe, D.A. Healey and J. Joergensen, 1969. The time distribution of serial oceanographic data from the Ocean Station P programme. Fish. Res. Bd. Can. Tech. Rept. No. 106.

MacNeill, M., 1977. A study of anomalous salinity and oxygen values in the deep water at Ocean Station P from 1960-1976 (unpublished manuscript). Pacific Marine Science Report 77-9.

Reiniger, R.F. and C.K. Ross, 1968. A method of interpolation with application to oceanographic data. Deep Sea Res. 15, 185-193.

U.S.N. Hydrographic Office, 1955. Instruction Manual for oceanographic observations. Publ. No. 607.

LOG OF HYDROGRAPHIC AND STD OBSERVATIONS

Consec. #	Positions	Date (Z)	Time (Z)	STD (m)	Hydrocast (m)	Comments
001	125-33° W	24/03/78	2310	80		
002	136-40° W	26/03/78	0705	1,500		
003	140-40° W	26/03/78	2000	1,500		
004I	140-40° W	26/03/78	2145		175	T, S
004II	140-40° W	26/03/78	2130		1,500	T, S
005	142-40° W	27/03/78	0540	1,500		
006	P	28/03/78	1700	1,500		
007I	P	28/03/78	1745		200	T, S, O_2, Nut., Trit.
007II	P	28/03/78	1915		1,500	T, S, O_2, Nut., Trit.
008	P	29/03/78	1700	300		
009	P	29/03/78	1930		0	T, S, P.O.C.
010	P	30/03/78	1700	300		
011	P	30/03/78	1730		75	T, S, Chlor-a
012	P	31/03/78	1700	1,500		
013	P	31/03/78	1700		1,500	T, S (top/ bottom STD check)
014	P	01/04/78	1700	300		start
015	E3	01/04/78	1845	300		MILE
016	E4	01/04/78	2000	300		grid
017	C1	01/04/78	2130	300		
018	W4	02/04/78	0040	300		
019	W3	02/04/78	0200	300		
020	P	02/04/78	1700	300		
021	P	03/04/78	1700	300		
022I	P	08/04/78	1730		4,200	T, S, O_2, Alk.
022II	P	08/04/78	2025		600	T, S, O_2, Alk.
023	P	08/04/78	2130	1,500		
024	P	10/04/78	1705	300		
025	P	10/04/78	1830		0	P.O.C., T, S
026	P	10/04/78	1845		20	T, S, P.O.C.
027	P	10/04/78	1940		50	T, S, P.O.C.
028	P	10/04/78	2035		100	T, S, P.O.C.
029	P	10/04/78	2145		200	T, S, P.O.C.
030	P	10/04/78	2200		300	T, S, P.O.C.
031	P	11/04/78	0040		500	T, S, P.O.C.
032	P	11/04/78	0115		750	T, S, P.O.C.
033	P	11/04/78	1720	1,500		
034	P	11/04/78	1720		1,500	T, S (top/ bottom STD check)

LOG OF HYDROGRAPHIC AND STD OBSERVATIONS (continued)

Consec #	Positions	Date (Z)	Time (Z)	STD (m)	Hydrocast (m)	Comments
035	P	11/04/78	1830		3,000	T, S, P.O.C., Alk. Std.
036	P	12/04/78	1710	300		
037	E3	12/04/78	1825	300		Start MILE grid
038	E4	12/04/78	1930	300		
039	C1	12/04/78	2045	300		
040	W4	12/04/78	2100	300		
041	W3	12/04/78	2330	300		
042	P	13/04/78	1710	1,500		
043I	P	13/04/78	1745		1,500	T, S, P.O.C., Alk, Tot. CO_2, O_2
043II	P	13/04/78	1920		500	T, S, Alk, Tot. CO_2, O_2
044	P	14/04/78	1705	300		
045	P	15/04/78	1705	300		
046	P	17/04/78	1710	1,500		
047	P	17/04/78	1750		75	T, S, Chlor-a
048	P	18/04/78	1710	300		
049	P	18/04/78	1745		0	P.O.C., T, S
050	P	18/04/78	1800		20	P.O.C., T, S
051	P	18/04/78	1840		50	P.O.C., T, S
052	P	18/04/78	1910		100	P.O.C., T, S
053	P	18/04/78	1945		200	P.O.C., T, S
054	P	18/04/78	2010		300	P.O.C., T, S
055	P	18/04/78	2035		500	P.O.C., T, S
056	P	18/04/78	2135		750	P.O.C., T, S
057	P	18/04/78	2305		1,000	P.O.C., T, S
058	P	19/04/78	1710	1,500		
059I	P	19/04/78	1755		1,500	T, S, O_2,Nut.
059II	P	19/04/78	1915		500	T, S, O_2,Nut.
060	P	20/04/78	1710	300		
061	E3	20/04/78	1820	300		Start MILE grid
062	E4	20/04/78	1935	300		
063	C1	20/04/78	2050	300		
064	W4	20/04/78	2200	300		
065	W3	20/04/78	2330	300		
066	P	21/04/78	1700	300		
067	P	21/04/78	1730		3,000	T, S, P.O.C., Alk. Std.
068	P	22/04/78	1710	300		
069	P	23/04/78	1720	300		
070	P	24/04/78	1710	300		
071	P	24/04/78	1730		0	T, S, P.O.C.
072	P	25/04/78	1930	300		
073I	P	26/04/78	1710		4,200	T, S, O_2
073II	P	26/04/78	2010		600	T, S, O_2

LOG OF HYDROGRAPHIC AND STD OBSERVATIONS (continued)

Consec #	Positions	Date (Z)	Time (Z)	STD (m)	Hydrocast (m)	Comments
074	P	26/04/78	2100	1,500		
075	P	27/04/78	1710	300		
076	P	30/04/78	1710	300		
077	P	30/04/78	1800		0	T, S, P.O.C.
078	P	03/05/78	1710	1,500		
079I	P	03/05/78	1750		1,500	T, S, O_2
079II	P	03/05/78	1905		500	T, S, O_2
080	P	04/05/78	1710	300		
081	142-40° W	07/05/78	2045	1,500		
082I	142-40° W	07/05/78	2140		1,500	T, S
082II	142-40° W	07/05/78	2235		500	T, S
083	140-40° W	08/05/78	0530	1,500		
084	138-40° W	08/05/78	1145	1,500		
085	136-40° W	08/05/78	1810	1,500		
086I	136-40° W	08/05/78	1900		1,500	T, S
086II	136-40° W	08/05/78	2000		500	T, S
087	134-40° W	09/05/78	0300	1,500		
088	132-40° W	09/05/78	0950	1,500		
089	130-40° W	09/05/78	1720	1,500		
090	128-40° W	10/05/78	0025	1,500		
091	127-40° W	10/05/78	0420	1,500		
092	126-40° W	10/05/78	0805	1,200		
093	126-00° W	10/05/78	1040	80		
094	125-33° W	10/05/78	1220	90		

<u>Note</u>: P.O.C. = particulate organic carbon

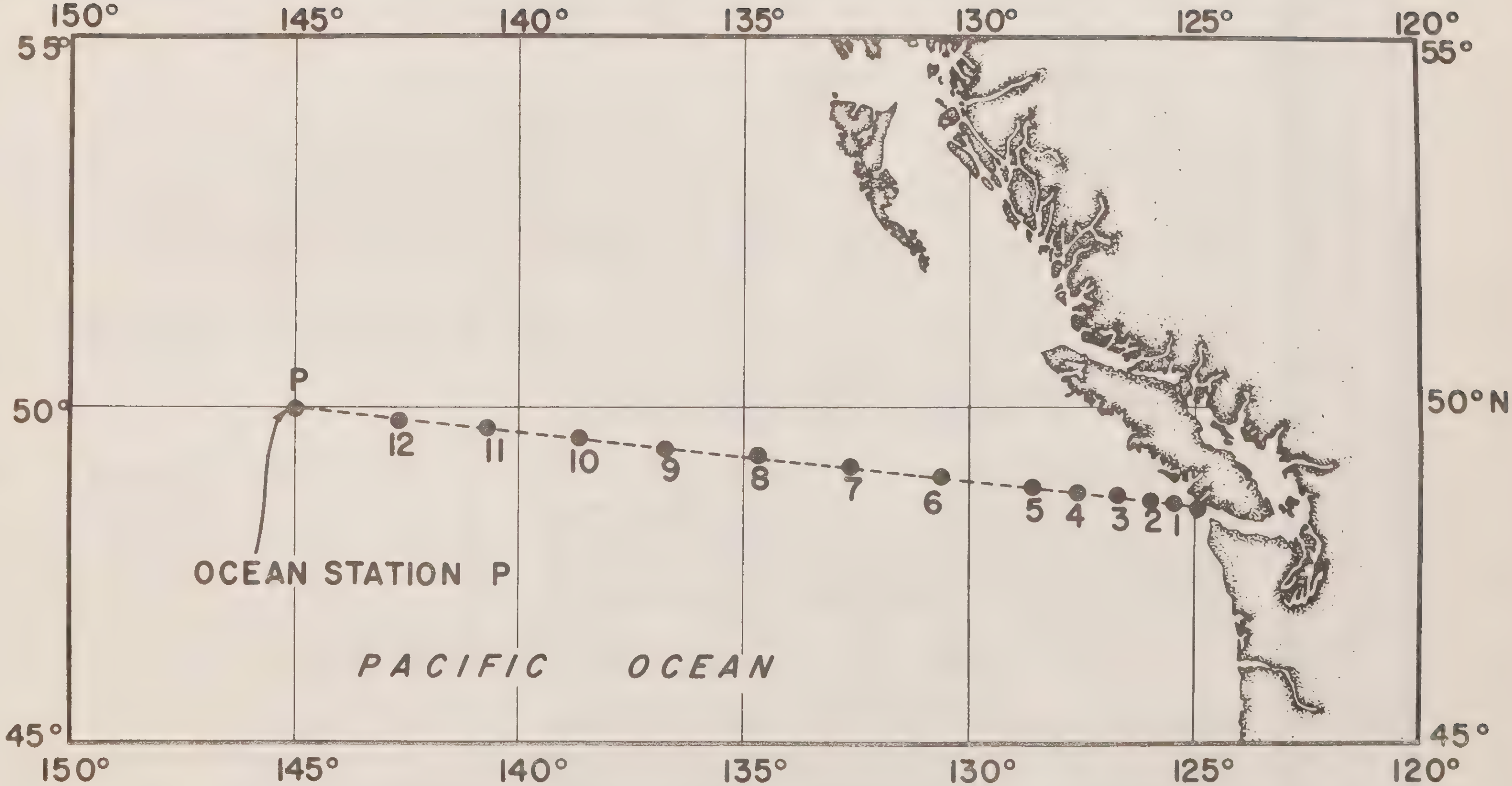


Fig. 1 Chart showing Line P station positions.

Oceanographic Data Obtained on Cruise P-78-3

(CODC Reference No. 15-78-003)

Results of Hydrographic Observations

(P-78-3)

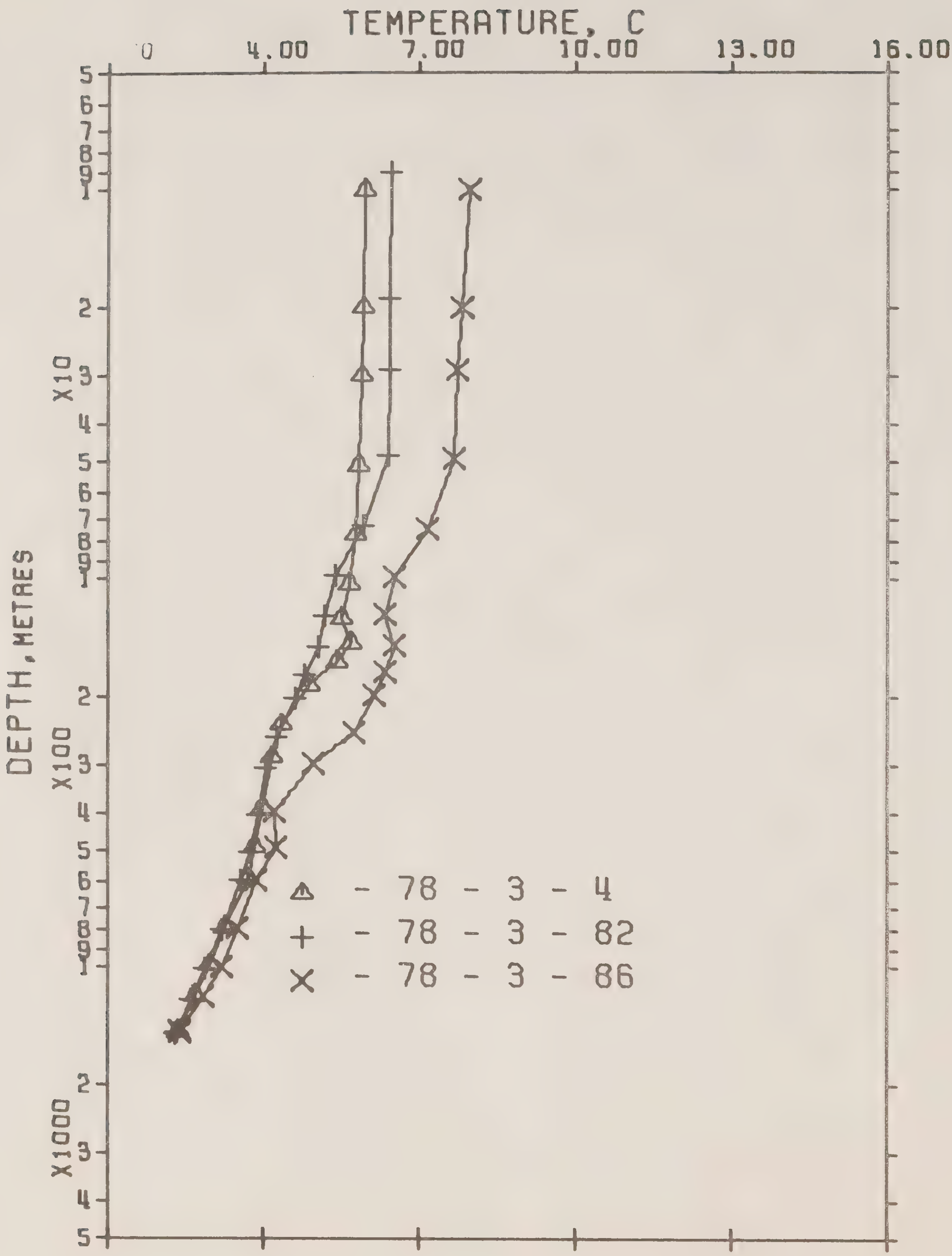


Figure 2. Composite plot of temperature vs $\log_{10}$ depth for Line P Stations.

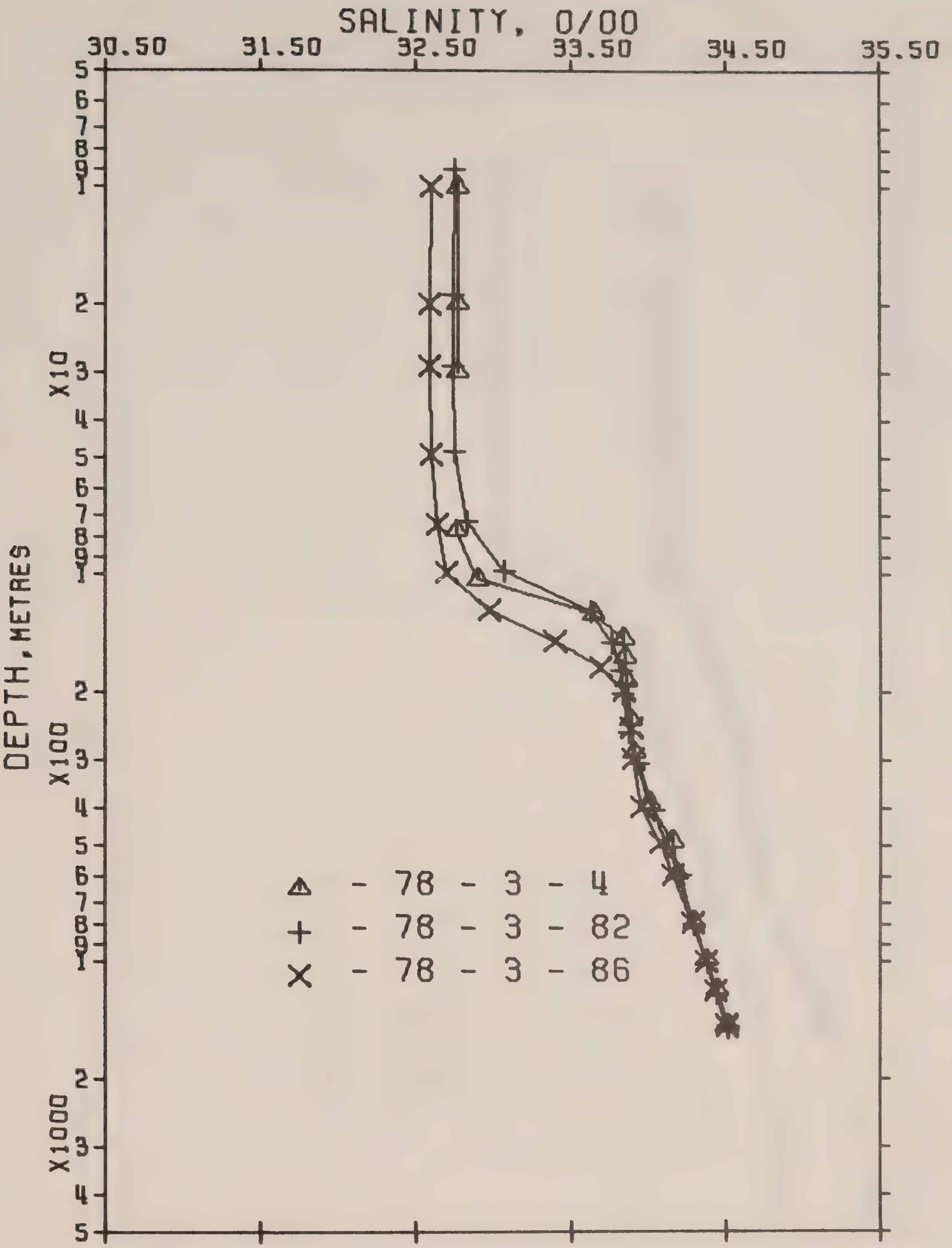


Figure 3. Composite plot of salinity vs $\log_{10}$ depth for Line P Stations.

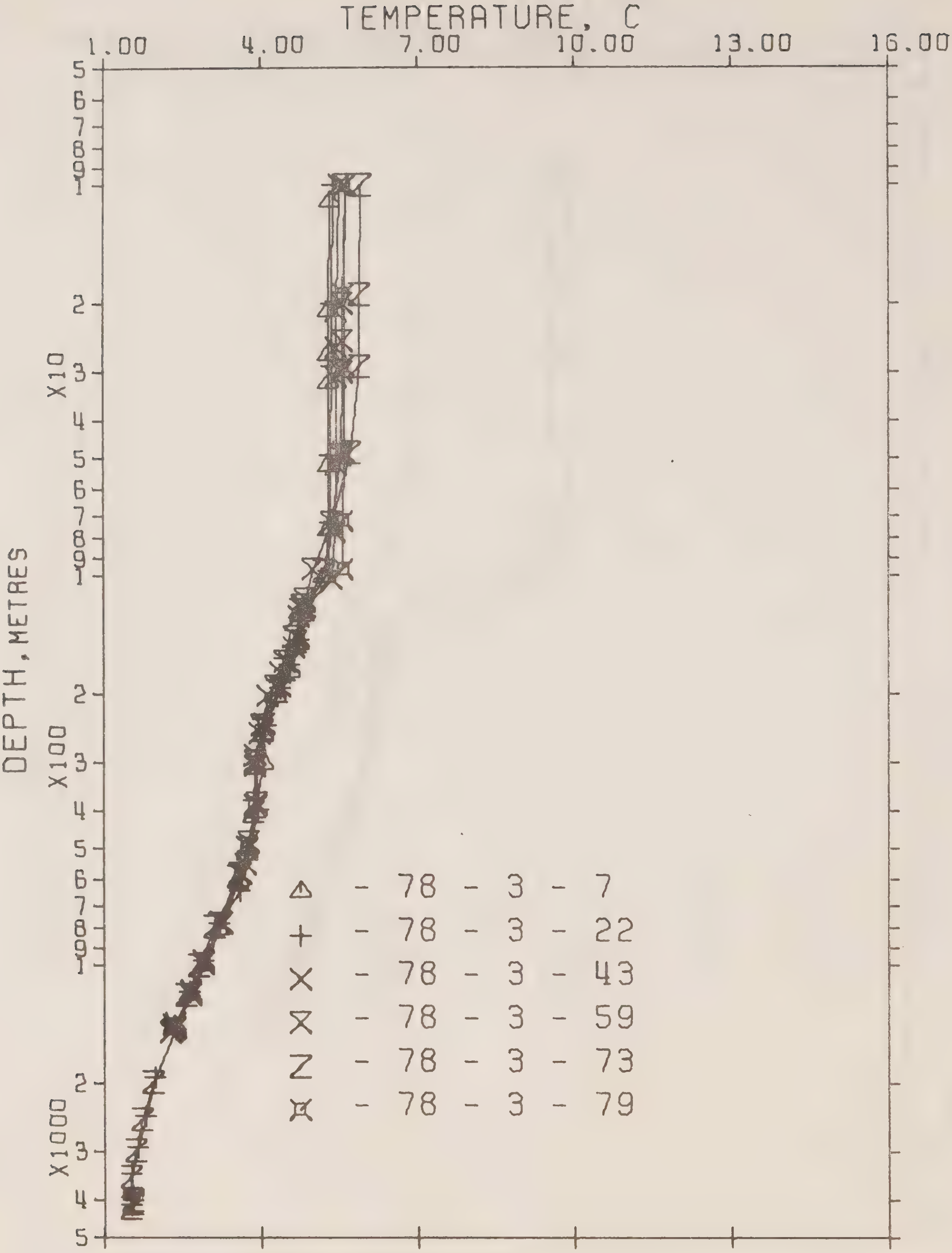


Figure 4. Composite plot of temperature vs $\log_{10}$ depth for Station P.

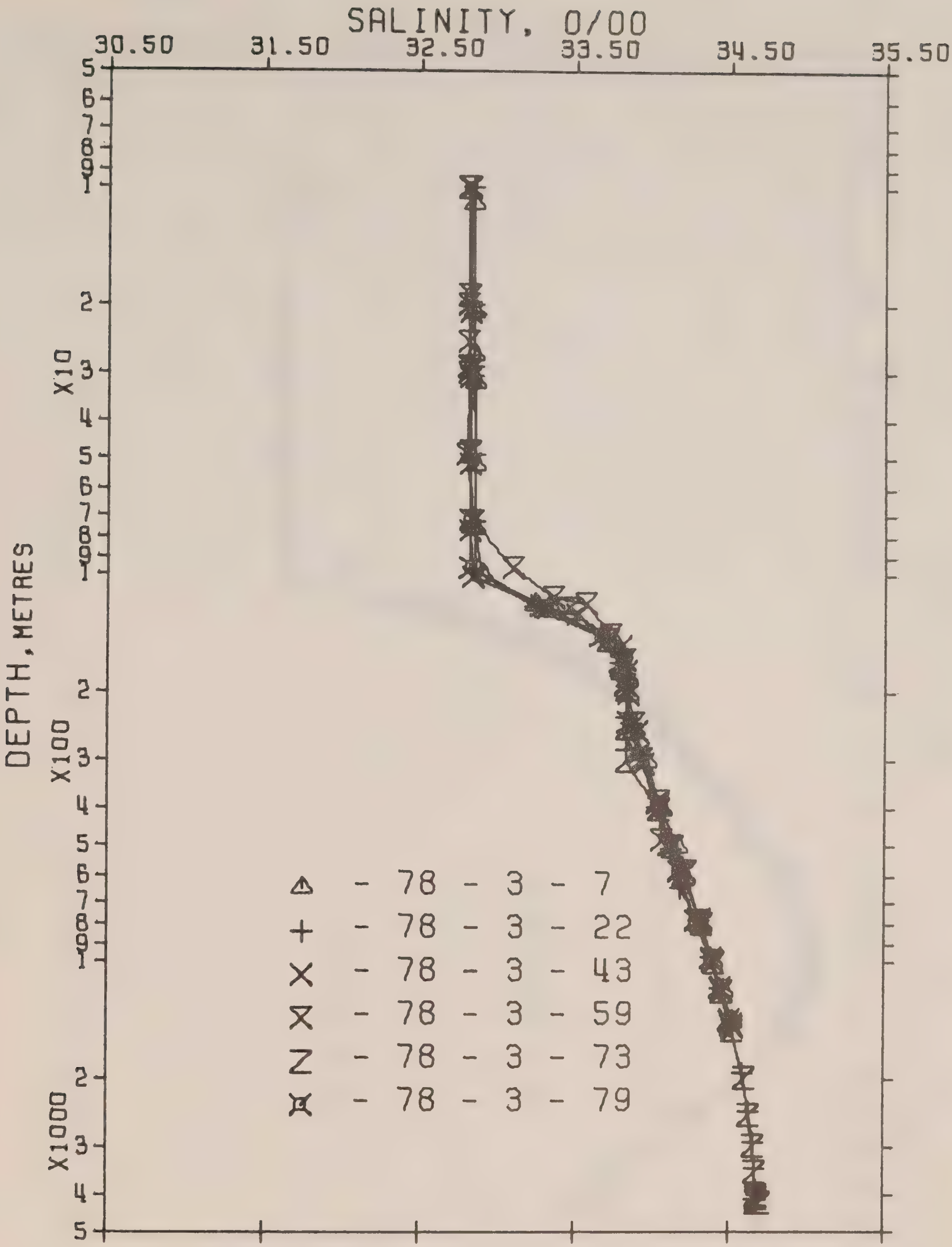


Figure 5. Composite plot of salinity vs $\log_{10}$ depth for Station P.

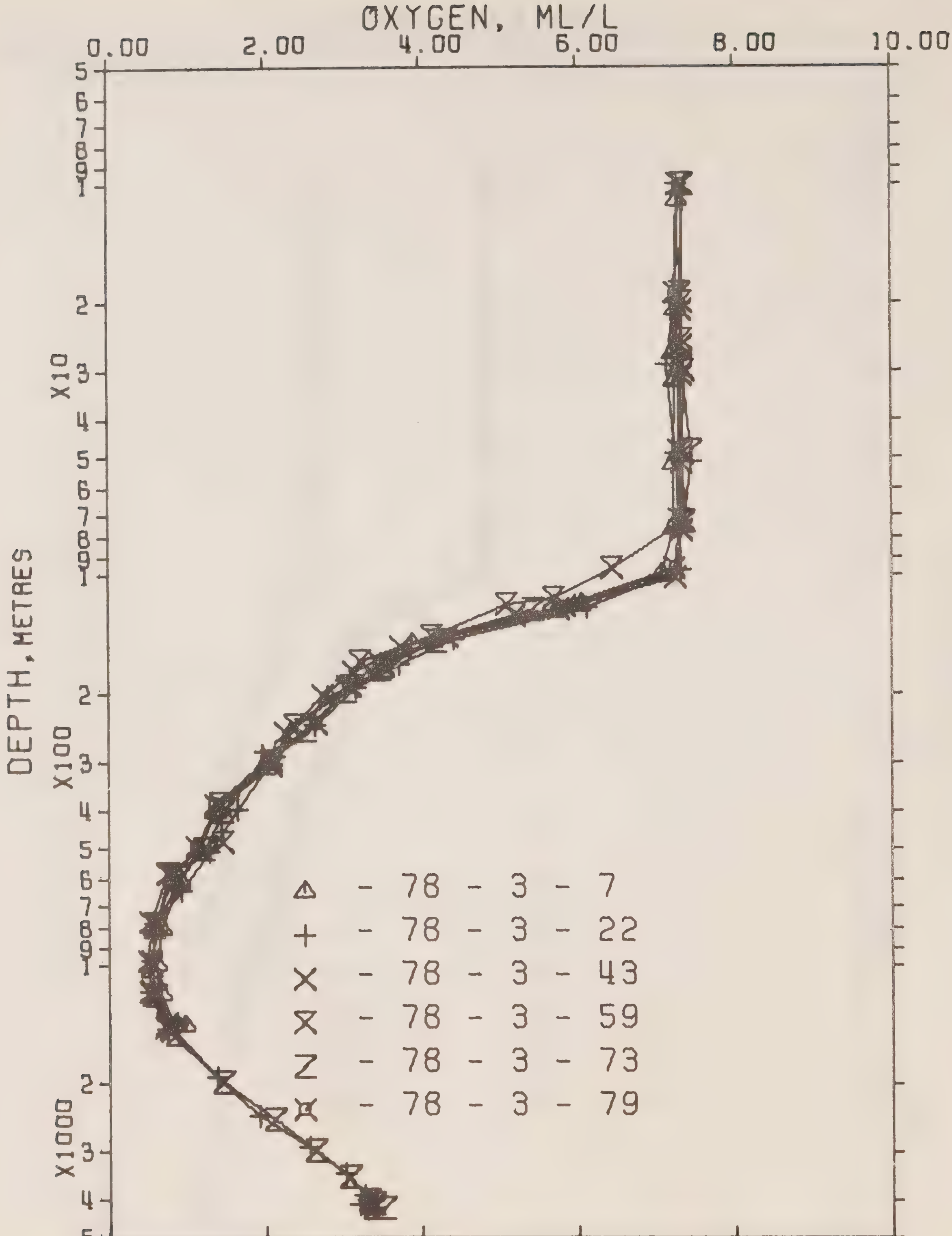
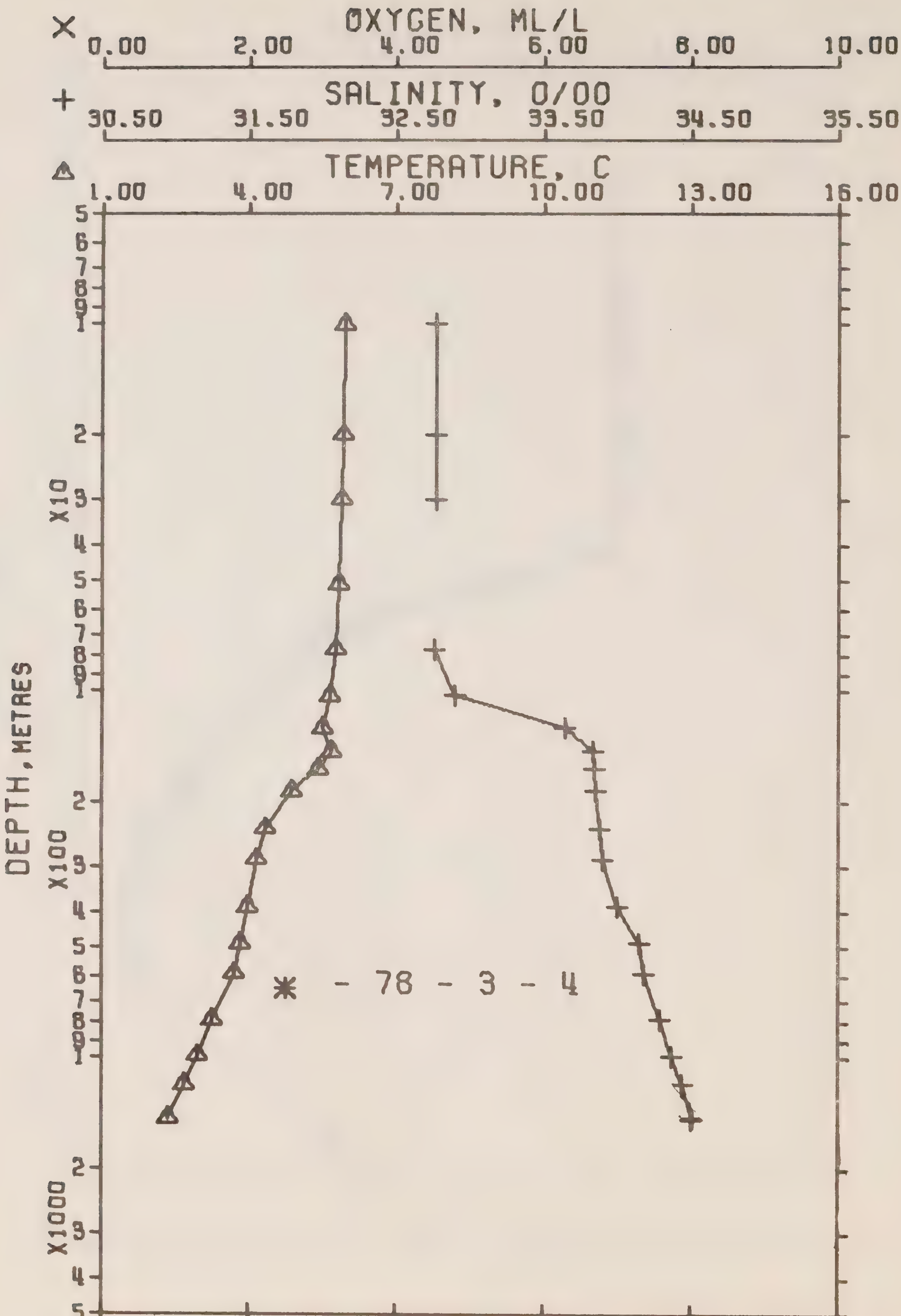


Figure 6. Composite plot of oxygen vs $\log_{10}$ depth for Station P.

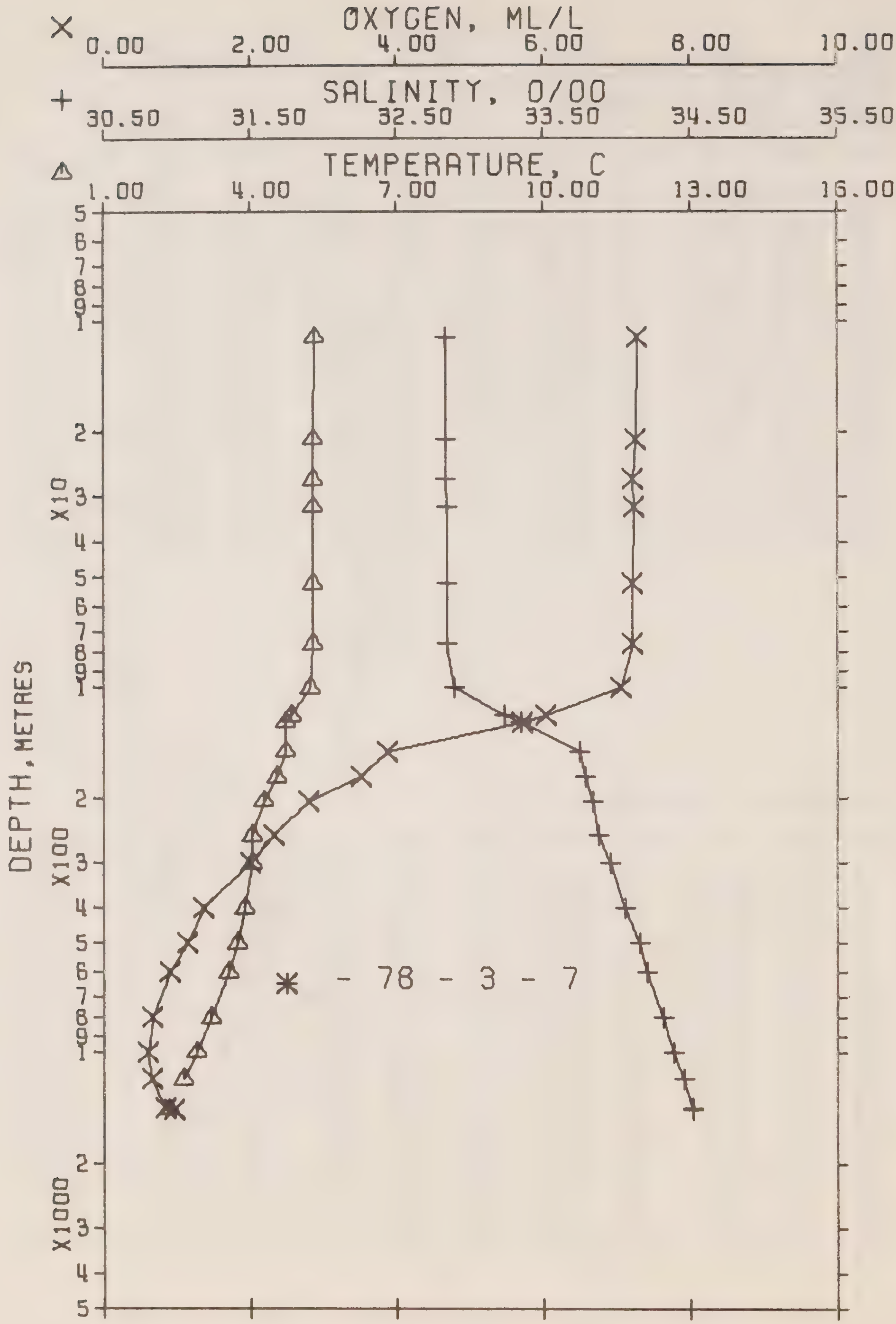

X OXYGEN, ML/L
0.00 2.00 4.00 6.00 8.00 10.00
+ SALINITY, 0/00
30.50 31.50 32.50 33.50 34.50 35.50
△ TEMPERATURE, C
1.00 4.00 7.00 10.00 13.00 16.00
DEPTH, METRES
X10
X100
X1000
* - 78 - 3 - 4

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 4 DATE 26/ 3/78 GMT 21.1
POSITION 49-10.0 N, 140-40.0 W STATION 11
OBSERVED DATA

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	5.98	32.772	0	25.820	218.6	5.98	218.6	.00	.00		1472.
10	5.96	32.767	10	25.819	218.9	5.96	218.8	.22	.01		1472.
20	5.91	32.771	20	25.828	218.1	5.91	217.9	.44	.05		1472.
30	5.90	32.772	30	25.830	218.0	5.90	217.7	.66	.10		1472.
51	5.82	32.763*	51	25.833	218.0	5.82	217.4	1.12	.29		1472.
77	5.76	32.756	77	25.835	218.1	5.75	217.2	1.69	.67		1472.
104	5.65	32.897	103	25.959	206.6	5.64	205.4	2.25	1.18		1473.
127	5.50	33.637	126	26.560	149.8	5.49	148.2	2.66	1.66		1473.
147	5.68	33.828	146	26.689	137.9	5.67	136.0	2.95	2.07		1475.
164	5.41	33.841	163	26.732	134.0	5.40	131.9	3.18	2.44		1474.
188	4.86	33.850	187	26.803	127.3	4.85	125.2	3.50	3.00		1472.
239	4.32	33.878	237	26.884	119.8	4.30	117.5	4.12	4.36		1471.
289	4.15	33.902	287	26.921	116.7	4.13	114.0	4.72	5.96		1471.
390	3.98	34.001	387	27.017	108.4	3.95	104.8	5.85	9.88		1472.
492	3.82	34.147	488	27.149	96.6	3.78	92.2	6.89	14.53		1473.
593	3.69	34.176	588	27.185	93.8	3.65	88.7	7.85	19.87		1474.
794	3.25	34.292	787	27.320	82.0	3.19	75.9	9.61	32.29		1476.
995	2.95	34.373	985	27.412	74.0	2.88	67.1	11.17	46.49		1478.
1192	2.69	34.442	1180	27.490	67.2	2.61	59.6	12.56	61.98		1480.
1473	2.36	34.507	1457	27.570	60.2	2.26	51.9	14.31	85.66		1483.
1483	2.34	34.502	1467	27.568	60.4	2.24	52.1	14.37	86.58		1483.

INTERPOLATED TO STANDARD PRESSURE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	5.98	32.772	0	25.820	218.6	5.98	218.6	.00	.00		1472.
10	5.96	32.767	10	25.819	218.9	5.96	218.8	.22	.01		1472.
20	5.91	32.771	20	25.828	218.1	5.91	217.9	.44	.05		1472.
30	5.90	32.772	30	25.830	218.0	5.90	217.7	.66	.10		1472.
50	5.82	32.763	50	25.833	218.0	5.82	217.4	1.09	.28		1472.
75	5.76	32.757	75	25.834	218.1	5.76	217.2	1.64	.63		1472.
100	5.66	32.879	99	25.943	208.0	5.66	206.9	2.17	1.10		1473.
125	5.51	33.583	124	26.517	153.9	5.50	152.4	2.63	1.63		1473.
150	5.63	33.830	149	26.697	137.2	5.62	135.2	2.99	2.13		1474.
175	5.15	33.845	174	26.766	130.8	5.14	128.7	3.33	2.69		1473.
200	4.72	33.857	199	26.824	125.4	4.71	123.2	3.65	3.30		1472.
225	4.45	33.871	223	26.864	121.7	4.44	119.4	3.95	3.96		1471.
250	4.28	33.884	248	26.893	119.1	4.26	116.6	4.26	4.69		1471.
300	4.13	33.914	298	26.933	115.7	4.11	112.8	4.84	6.34		1471.
400	3.96	34.017	397	27.031	107.1	3.93	103.4	5.96	10.31		1472.
500	3.81	34.149	496	27.152	96.4	3.77	91.9	6.96	14.92		1473.
600	3.67	34.181	595	27.190	93.4	3.63	88.2	7.92	20.27		1474.
700	3.44	34.242	694	27.262	87.1	3.39	81.4	8.82	26.24		1475.
800	3.24	34.295	793	27.323	81.7	3.18	75.6	9.66	32.68		1476.
900	3.08	34.337	892	27.371	77.5	3.02	71.0	10.46	39.57		1477.
1000	2.94	34.375	990	27.414	73.8	2.87	66.8	11.21	46.90		1478.
1200	2.68	34.444	1188	27.492	67.0	2.60	59.3	12.62	62.62		1480.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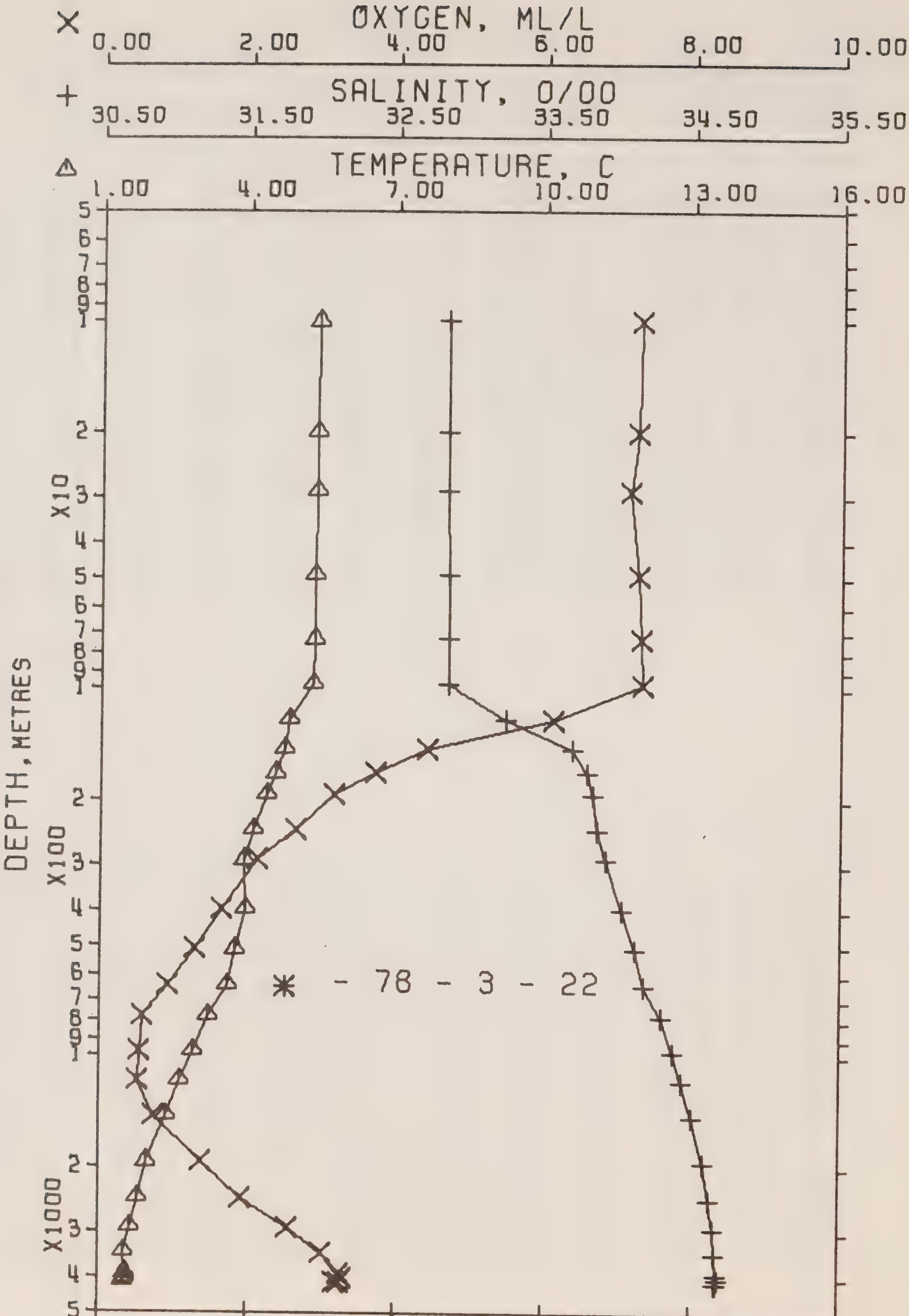
△ TEMPERATURE, C
1.00 4.00 7.00 10.00 13.00 16.00
DEPTH, METRES
X10
X100
X1000
* - 78 - 3 - 7

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 7 DATE 28/ 3/78 GMT 18.1
POSITION 50- .0 N, 145- .0 W STATION P
OBSERVED DATA

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	5.31	32.844	0	25.957	205.7	5.31	205.7	.00	.00	7.25	1469.
11	5.31	32.841	11	25.955	206.0	5.31	205.9	.23	.01	7.28	1470.
21	5.29	32.837	21	25.954	206.2	5.29	206.0	.44	.05	7.25	1470.
27	5.29	32.839	27	25.955	206.1	5.29	205.8	.56	.08	7.23	1470.
32	5.29	32.847	32	25.962	205.5	5.29	205.2	.66	.11	7.25	1470.
52	5.29	32.852	52	25.966	205.4	5.29	204.8	1.08	.29	7.23	1470.
77	5.28	32.848	76	25.964	205.8	5.27	205.0	1.57	.61	7.22	1471.
101	5.24	32.896	100	26.006	202.0	5.23	200.9	2.07	1.06	7.06	1471.
120	4.84	33.238	119	26.321	172.2	4.83	171.0	2.43	1.46	6.05	1470.
125	4.71	33.349	124	26.423	162.5	4.70	161.3	2.51	1.57	5.71	1470.
150	4.73	33.755	149	26.742	132.6	4.72	131.0	2.88	2.09	3.88	1471.
176	4.54	33.791	175	26.792	128.1	4.53	126.3	3.22	2.65	3.53	1470.
205	4.27	33.844	204	26.862	121.6	4.26	119.6	3.58	3.35	2.81	1470.
255	4.04	33.883	253	26.917	116.7	4.02	114.3	4.17	4.73	2.31	1470.
304	4.02	33.959	302	26.980	111.2	4.00	108.4	4.73	6.34	2.00	1471.
405	3.88	34.058	402	27.072	103.2	3.85	99.5	5.81	10.24	1.36	1472.
506	3.72	34.156	502	27.166	95.0	3.68	90.6	6.81	14.89	1.15	1473.
607	3.55	34.214	602	27.229	89.6	3.51	84.6	7.75	20.17	.90	1474.
809	3.19	34.316	802	27.344	79.6	3.13	73.5	9.45	32.47	.65	1476.
1006	2.90	34.395	996	27.434	71.9	2.83	65.0	10.94	46.18	.60	1478.
1191	2.61	34.460	1179	27.511	65.0	2.53	57.6	12.21	60.37	.66	1480.
1432	2.33*	34.524	1416	27.586	58.4	2.23	50.4	13.66	79.71	.83	1483.
1440	2.32	34.521	1424	27.584	58.5	2.22	50.5	13.70	80.41	.96	1483.

INTERPOLATED TO STANDARD PRESSURE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	5.31	32.844	0	25.957	205.7	5.31	205.7	.00	.00	7.25	1469.
10	5.31	32.841	10	25.955	206.0	5.31	205.9	.21	.01	7.28	1470.
20	5.29	32.837	20	25.954	206.2	5.29	206.0	.41	.04	7.26	1470.
30	5.29	32.844	30	25.959	205.8	5.29	205.5	.62	.09	7.24	1470.
50	5.29	32.852	50	25.965	205.4	5.29	204.8	1.03	.26	7.23	1470.
75	5.28	32.848	75	25.964	205.8	5.27	205.0	1.54	.59	7.22	1471.
100	5.24	32.895	99	26.005	202.1	5.23	201.0	2.05	1.04	7.06	1471.
125	4.71	33.349	124	26.423	162.5	4.70	161.3	2.51	1.57	5.71	1470.
150	4.73	33.755	149	26.742	132.6	4.72	131.0	2.88	2.09	3.88	1471.
175	4.55	33.789	174	26.789	128.3	4.54	126.5	3.20	2.62	3.54	1470.
200	4.32	33.835	199	26.850	122.7	4.30	120.8	3.52	3.22	2.93	1470.
225	4.17	33.860	223	26.886	119.5	4.16	117.4	3.82	3.87	2.60	1470.
250	4.06	33.879	248	26.912	117.1	4.04	114.8	4.11	4.59	2.36	1470.
300	4.02	33.953	298	26.974	111.6	4.00	108.9	4.69	6.19	2.02	1470.
400	3.89	34.053	397	27.068	103.5	3.86	99.9	5.76	10.02	1.39	1472.
500	3.73	34.151	496	27.161	95.4	3.69	91.1	6.76	14.58	1.16	1473.
600	3.56	34.210	595	27.225	90.0	3.52	85.0	7.68	19.77	.92	1474.
700	3.37	34.264	694	27.286	84.7	3.32	79.1	8.56	25.56	.78	1475.
800	3.20	34.312	793	27.340	80.0	3.15	74.0	9.38	31.85	.66	1476.
900	3.05	34.355	891	27.388	75.9	2.99	69.3	10.16	38.59	.63	1477.
1000	2.91	34.393	990	27.431	72.1	2.84	65.2	10.90	45.76	.60	1478.
1200	2.60	34.463	1188	27.514	64.7	2.52	57.3	12.26	61.06	.67	1480.



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33.50
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TEMPERATURE, C
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4.00
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10.00
13.00
16.00
DEPTH, METRES
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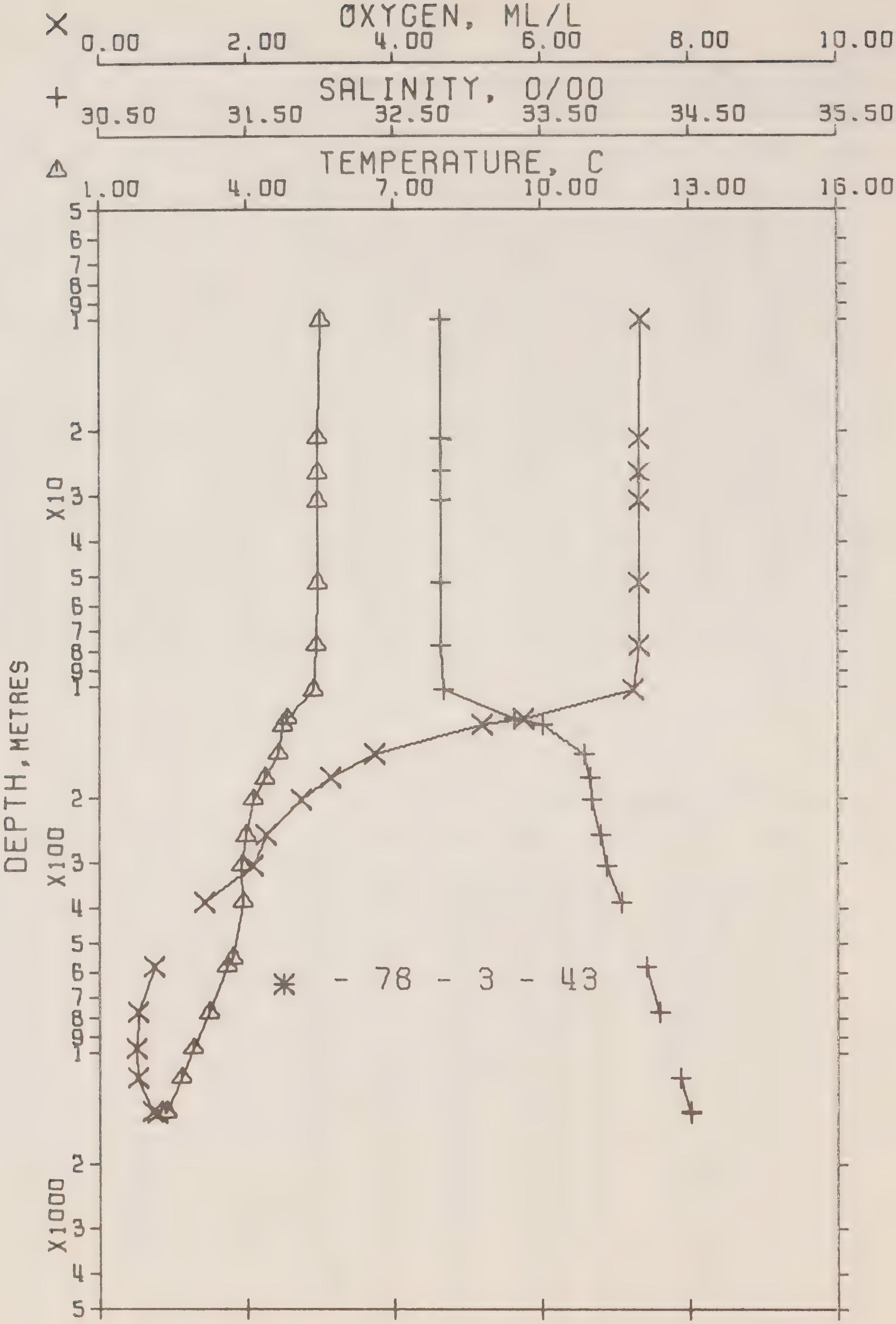
X1000
* - 78 - 3 - 22

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 22 DATE 8/ 4/78 GMT 21.1
POSITION 50- .0 N, 145- .0 W STATION P
OBSERVED DATA

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	5.41	32.838	0	25.941	207.2	5.41	207.2	.00	.00	7.36	1470.
10	5.39	32.841	10	25.945	206.9	5.39	206.8	.21	.01	7.27	1470.
20	5.35	32.843	20	25.952	206.4	5.35	206.2	.42	.04	7.25	1470.
29	5.35	32.842	29	25.951	206.6	5.35	206.2	.60	.09	7.14	1470.
49	5.33	32.846	49	25.956	206.2	5.33	205.7	1.02	.26	7.27	1470.
73	5.31	32.850	73	25.962	205.9	5.30	205.2	1.52	.57	7.31	1471.
98	5.29	32.854	97	25.967	205.7	5.28	204.6	2.02	1.01	7.32	1471.
122	4.81	33.236	121	26.323	172.1	4.80	170.8	2.48	1.52	6.12	1470.
146	4.73	33.691	145	26.692	137.3	4.72	135.8	2.85	2.03	4.42	1471.
170	4.54	33.790	169	26.791	128.1	4.53	126.4	3.17	2.54	3.71	1470.
194	4.35	33.826	193	26.840	123.6	4.34	121.7	3.48	3.11	3.16	1470.
243	4.09	33.858	241	26.892	119.0	4.07	116.7	4.06	4.41	2.64	1470.
293	3.92	33.918	291	26.957	113.1	3.90	110.5	4.65	6.01	2.12	1470.
399	3.93	34.027	396	27.043	106.0	3.90	102.4	5.81	10.10	1.64	1472.
514	3.74	34.118	510	27.134	98.1	3.70	93.6	6.98	15.55	1.29	1473.
645	3.59	34.182	639	27.200	92.7	3.54	87.3	8.22	22.89	.92	1475.
782	3.20	34.301	775	27.332	80.7	3.15	74.8	9.41	31.50	.58	1475.
978	2.90	34.380	969	27.422	72.9	2.83	66.1	10.91	44.97	.54	1477.
1175	2.61	34.437	1163	27.493	66.6	2.53	59.3	12.28	59.96	.53	1479.
1471	2.34	34.510	1455	27.574	59.7	2.24	51.5	14.14	85.08	.75	1483.
1966	1.97	34.591	1942	27.669	51.6	1.84	42.3	16.89	133.09	1.38	1490.
2465	1.77	34.631	2432	27.716	48.0	1.59	37.6	19.37	189.03	1.93	1498.
2967	1.62	34.659	2924	27.750	45.6	1.40	34.2	21.71	253.85	2.56	1505.
3472	1.52	34.675	3418	27.770	44.4	1.25	32.0	23.97	328.03	3.02	1514.
3982	1.54	34.684	3916	27.775	45.4	1.22	31.0	26.27	415.40	3.25	1523.
4085	1.53	34.686	4016	27.778	45.4	1.20	30.8	26.74	434.53	3.30	1524.
4178	1.52	34.674+	4106	27.769	46.3	1.18	31.5	27.16	452.46	3.20+	1526.
4188	1.52	34.678	4116	27.772	46.0	1.18	31.2	27.21	454.48	3.27	1526.

INTERPOLATED TO STANDARD PRESSURE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	5.41	32.838	0	25.941	207.2	5.41	207.2	.00	.00	7.36	1470.
10	5.39	32.841	10	25.945	206.9	5.39	206.8	.21	.01	7.27	1470.
20	5.35	32.843	20	25.952	206.4	5.35	206.2	.42	.04	7.25	1470.
30	5.35	32.842	30	25.951	206.5	5.35	206.2	.62	.09	7.15	1470.
50	5.33	32.846	50	25.956	206.2	5.33	205.7	1.03	.26	7.27	1470.
75	5.31	32.850	75	25.962	205.9	5.30	205.1	1.55	.59	7.31	1471.
100	5.24	32.895	99	26.005	202.1	5.23	201.0	2.07	1.06	7.19	1471.
125	4.80	33.301	124	26.375	167.1	4.79	165.8	2.53	1.59	5.88	1470.
150	4.70	33.708	149	26.709	135.7	4.69	134.1	2.91	2.11	4.30	1470.
175	4.50	33.798	174	26.801	127.2	4.49	125.4	3.23	2.65	3.60	1470.
200	4.32	33.830	199	26.846	123.0	4.30	121.1	3.55	3.25	3.10	1470.
225	4.18	33.847	223	26.874	120.6	4.16	118.4	3.85	3.91	2.82	1470.
250	4.06	33.867	248	26.902	118.1	4.05	115.8	4.15	4.63	2.56	1470.
300	3.92	33.926	298	26.964	112.6	3.90	109.9	4.72	6.24	2.09	1470.
400	3.93	34.028	397	27.043	105.9	3.90	102.3	5.82	10.14	1.64	1472.
500	3.76	34.108	496	27.124	99.0	3.73	94.6	6.84	14.82	1.33	1473.
600	3.64	34.162	595	27.179	94.4	3.60	89.3	7.80	20.23	1.04	1474.
700	3.42	34.233	694	27.256	87.6	3.37	82.0	8.72	26.31	.78	1475.
800	3.17	34.309	793	27.341	79.9	3.11	73.9	9.55	32.66	.58	1475.
900	3.01	34.351	891	27.388	75.8	2.95	69.3	10.33	39.39	.56	1477.
1000	2.87	34.387	990	27.430	72.1	2.80	65.3	11.07	46.55	.54	1478.
1200	2.58	34.444	1188	27.501	66.0	2.50	58.6	12.45	61.97	.55	1480.
1500	2.32	34.515	1484	27.580	59.2	2.21	50.9	14.31	87.69	.79	1484.
2000	1.95	34.594	1976	27.672	51.3	1.82	42.0	17.07	136.65	1.42	1491.
2500	1.76	34.633	2467	27.719	47.8	1.58	37.3	19.54	193.30	1.98	1498.
3000	1.61	34.660	2956	27.751	45.5	1.39	34.0	21.86	258.44	2.59	1506.
3500	1.52	34.676	3445	27.770	44.5	1.25	31.9	24.10	332.44	3.03	1514.
4000	1.54	34.684	3933	27.776	45.4	1.21	31.0	26.35	418.64	3.26	1523.
4100	1.53	34.684	4031	27.776	45.5	1.19	30.9	26.81	437.35	3.28	1525.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32.50
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TEMPERATURE, C
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DEPTH, METRES
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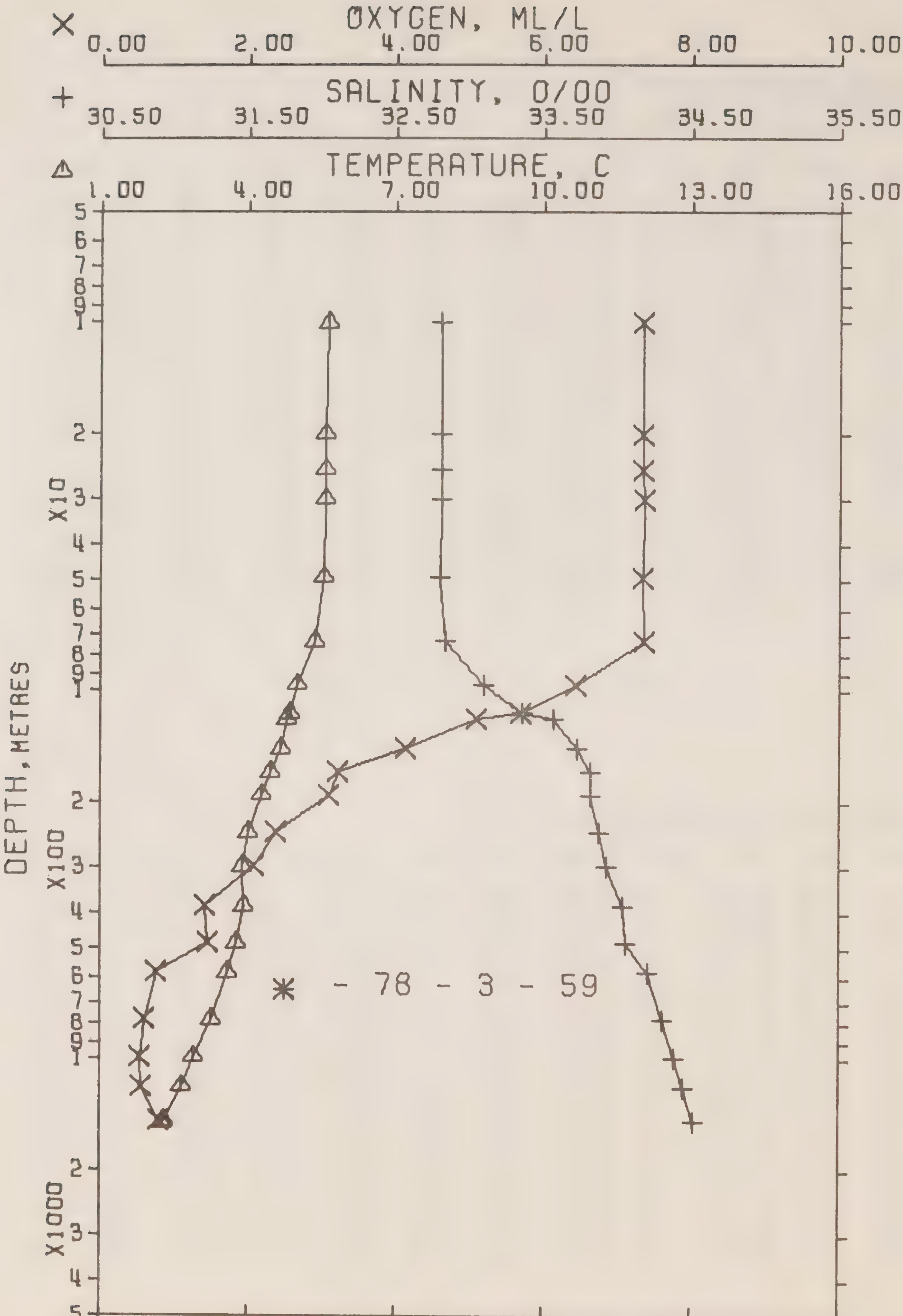
X100
X1000
* - 78 - 3 - 43

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 43 DATE 13/ 4/78 GMT 20.0
POSITION 50- .0 N, 145- .0 W STATION P
OBSERVED DATA

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	5.50	32.825	0	25.920	209.2	5.50	209.2	.00	.00	7.33	1470.
10	5.50	32.821	10	25.917	209.6	5.50	209.5	.21	.01	7.34	1470.
21	5.44	32.820	21	25.923	209.1	5.44	208.9	.44	.05	7.32	1470.
26	5.44	32.825	26	25.927	208.8	5.44	208.5	.55	.07	7.33	1470.
31	5.44	32.822	31	25.925	209.1	5.44	208.7	.65	.10	7.33	1470.
52	5.44	32.825	52	25.927	209.1	5.44	208.5	1.10	.29	7.32	1471.
78	5.42	32.825	77	25.929	209.1	5.41	208.2	1.62	.64	7.31	1471.
103	5.35	32.845	102	25.953	207.1	5.34	205.9	2.15	1.12	7.24	1471.
123	4.80	33.317	122	26.388	165.9	4.79	164.6	2.52	1.55	5.77	1470.
128	4.71	33.511	127	26.551	150.4	4.70	149.1	2.60	1.66	5.20	1470.
153	4.64	33.787	152	26.777	129.3	4.63	127.7	2.95	2.16	3.74	1470.
178	4.36	33.830	177	26.842	123.3	4.35	121.5	3.27	2.69	3.13	1470.
203	4.13	33.845	202	26.878	120.0	4.12	118.1	3.58	3.29	2.75	1469.
255	3.97	33.898	253	26.936	114.8	3.95	112.5	4.18	4.70	2.25	1469.
308	3.87	33.938	306	26.978	111.3	3.85	108.5	4.78	6.43	2.09	1470.
388	3.90	34.036	385	27.053	104.9	3.87	101.4	5.65	9.49	1.42	1471.
554	3.70	34.186*	549	27.192	92.9	3.66	88.1	7.28	17.30	.84*	1474.
584	3.58	34.209	579	27.222	90.1	3.54	85.2	7.55	18.91	.75	1474.
781	3.21	34.304	774	27.333	80.6	3.16	74.6	9.23	30.55	.53	1475.
978	2.89	34.382 *	969	27.424	72.6	2.82	65.9	10.74	44.05	.50	1477.
1175	2.65	34.445	1163	27.496	66.5	2.57	59.0	12.10	59.01	.51	1480.
1460	2.34	34.511	1444	27.575	59.6	2.24	51.4	13.86	82.51	.71	1483.
1470	2.33	34.507	1454	27.572	59.8	2.23	51.7	13.92	83.42	.78	1483.

INTERPOLATED TO STANDARD PRESSURE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	5.50	32.825	0	25.920	209.2	5.50	209.2	.00	.00	7.33	1470.
10	5.50	32.821	10	25.917	209.6	5.50	209.5	.21	.01	7.34	1470.
20	5.44	32.820	20	25.922	209.1	5.44	208.9	.42	.04	7.33	1470.
30	5.44	32.823	30	25.925	209.0	5.44	208.7	.63	.10	7.33	1470.
50	5.44	32.825	50	25.927	209.1	5.44	208.5	1.05	.27	7.32	1471.
75	5.42	32.825	75	25.929	209.1	5.42	208.3	1.57	.60	7.32	1471.
100	5.36	32.843	99	25.951	207.2	5.35	206.2	2.09	1.06	7.25	1471.
125	4.76	33.402	124	26.459	159.2	4.75	157.9	2.56	1.60	5.52	1470.
150	4.65	33.756	149	26.752	131.6	4.64	130.1	2.91	2.10	3.90	1470.
175	4.39	33.825	174	26.834	124.0	4.38	122.3	3.23	2.62	3.21	1470.
200	4.16	33.843	199	26.873	120.4	4.15	118.6	3.54	3.20	2.80	1469.
225	4.06	33.869	223	26.904	117.7	4.04	115.6	3.83	3.85	2.53	1469.
250	3.98	33.893	248	26.931	115.3	3.97	113.0	4.12	4.55	2.30	1469.
300	3.88	33.932	298	26.972	111.8	3.86	109.1	4.69	6.14	2.11	1470.
400	3.88	34.049	397	27.065	103.8	3.85	100.3	5.77	9.99	1.37	1472.
500	3.76	34.143	496	27.152	96.3	3.72	91.9	6.77	14.57	1.00	1473.
600	3.55	34.218	595	27.232	89.2	3.50	84.3	7.70	19.77	.73	1474.
700	3.35	34.268	694	27.291	84.1	3.30	78.6	8.56	25.51	.61	1475.
800	3.18	34.312	793	27.343	79.7	3.12	73.7	9.38	31.77	.53	1476.
900	3.01	34.353	891	27.391	75.5	2.95	69.1	10.16	38.49	.51	1477.
1000	2.86	34.389	990	27.433	71.9	2.79	65.1	10.90	45.62	.50	1478.
1200	2.62	34.451	1188	27.504	65.8	2.54	58.3	12.27	61.01	.53	1480.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SALINITY, 0/00
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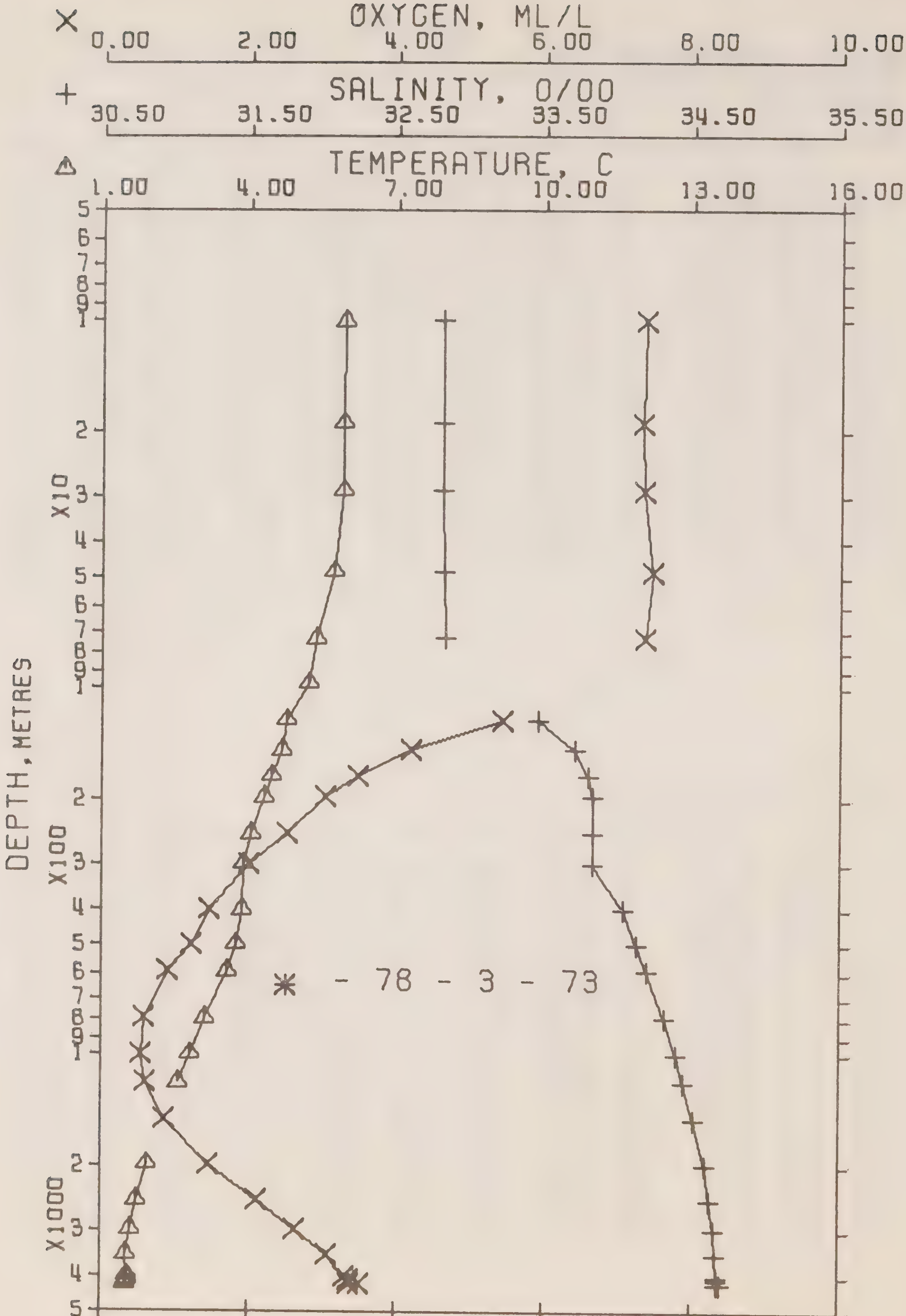
TEMPERATURE, C
1.00 4.00 7.00 10.00 13.00 16.00
DEPTH, METRES
X10
X100
X1000
✱ - 78 - 3 - 59

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 59 DATE 19/ 4/78 GMT 19.8
POSITION 50- .0 N, 145- .0 W STATION P
OBSERVED DATA

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	5.65	32.814	0	25.893	211.7	5.65	211.7	.00	.00	7.34	1471.
10	5.61	32.808	10	25.893	211.8	5.61	211.7	.21	.01	7.35	1471.
20	5.56	32.806	20	25.898	211.5	5.56	211.3	.43	.04	7.33	1471.
25	5.56	32.807	25	25.899	211.5	5.56	211.2	.53	.07	7.34	1471.
30	5.56	32.809	30	25.900	211.4	5.56	211.0	.64	.10	7.35	1471.
49	5.53	32.802	49	25.898	211.8	5.53	211.2	1.04	.26	7.33	1471.
73	5.35	32.839	73	25.948	207.2	5.34	206.4	1.56	.58	7.37	1471.
97	4.99	33.100	96	26.195	183.9	4.98	182.9	2.01	.98	6.45	1470.
116	4.85	33.361	115	26.417	163.1	4.84	161.9	2.34	1.34	5.70	1470.
120	4.77	33.571	119	26.592	146.5	4.76	145.3	2.40	1.41	5.09	1470.
144	4.67	33.731	143	26.730	133.7	4.66	132.2	2.74	1.86	4.14	1470.
167	4.44	33.816	166	26.822	125.1	4.43	123.4	3.04	2.34	3.21	1470.
192	4.27	33.825	191	26.847	122.9	4.26	121.0	3.35	2.91	3.09	1470.
244	4.00	33.884	242	26.922	116.1	3.98	113.9	3.97	4.27	2.37	1469.
301	3.89	33.928	299	26.968	112.1	3.87	109.5	4.62	6.10	2.07	1470.
386	3.90	34.042	383	27.058	104.4	3.87	100.9	5.54	9.30	1.41	1471.
487	3.76	34.058	483	27.084	102.6	3.73	98.3	6.59	14.00	1.46	1473.
585	3.57	34.208	580	27.222	90.1	3.53	85.2	7.54	19.14	.76	1474.
788	3.25	34.307	781	27.332	80.8	3.20	74.8	9.27	31.24	.60	1476.
994	2.90	34.386	984	27.427	72.5	2.83	65.7	10.84	45.48	.54	1478.
1198	2.65	34.449	1186	27.499	66.3	2.57	58.7	12.26	61.31	.56	1480.
1490	2.28	34.519	1474	27.586	58.5	2.18	50.4	14.08	86.17	.80	1483.

INTERPOLATED TO STANDARD PRESSURE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	5.65	32.814	0	25.893	211.7	5.65	211.7	.00	.00	7.34	1471.
10	5.61	32.808	10	25.893	211.8	5.61	211.7	.21	.01	7.35	1471.
20	5.56	32.806	20	25.898	211.5	5.56	211.3	.43	.04	7.33	1471.
30	5.56	32.809	30	25.900	211.4	5.56	211.0	.64	.10	7.35	1471.
50	5.52	32.803	50	25.900	211.6	5.52	211.0	1.06	.27	7.33	1471.
75	5.32	32.858	75	25.967	205.5	5.32	204.7	1.59	.61	7.30	1471.
100	4.96	33.149	99	26.237	180.0	4.96	179.0	2.07	1.04	6.31	1470.
125	4.75	33.608	124	26.624	143.6	4.74	142.2	2.48	1.50	4.87	1470.
150	4.61	33.754	149	26.755	131.3	4.60	129.8	2.82	1.98	3.89	1470.
175	4.38	33.819	174	26.830	124.4	4.37	122.6	3.14	2.51	3.17	1470.
200	4.23	33.835	199	26.860	121.8	4.21	119.8	3.45	3.10	2.97	1469.
225	4.09	33.864	223	26.897	118.4	4.08	116.3	3.75	3.75	2.62	1469.
250	3.99	33.889	248	26.928	115.6	3.97	113.4	4.04	4.46	2.34	1469.
300	3.89	33.927	298	26.967	112.2	3.87	109.6	4.61	6.05	2.08	1470.
400	3.88	34.044	397	27.062	104.1	3.85	100.6	5.68	9.88	1.42	1472.
500	3.73	34.079	496	27.104	100.8	3.70	96.5	6.73	14.66	1.36	1473.
600	3.54	34.216	595	27.232	89.3	3.50	84.3	7.67	19.95	.75	1474.
700	3.38	34.268	694	27.288	84.5	3.33	78.9	8.54	25.71	.66	1475.
800	3.23	34.312	793	27.338	80.3	3.17	74.2	9.36	32.00	.59	1476.
900	3.05	34.352	891	27.386	76.0	2.99	69.5	10.14	38.77	.57	1477.
1000	2.89	34.388	990	27.429	72.3	2.82	65.4	10.89	45.95	.54	1478.
1200	2.65	34.449	1188	27.500	66.2	2.57	58.7	12.27	61.45	.56	1480.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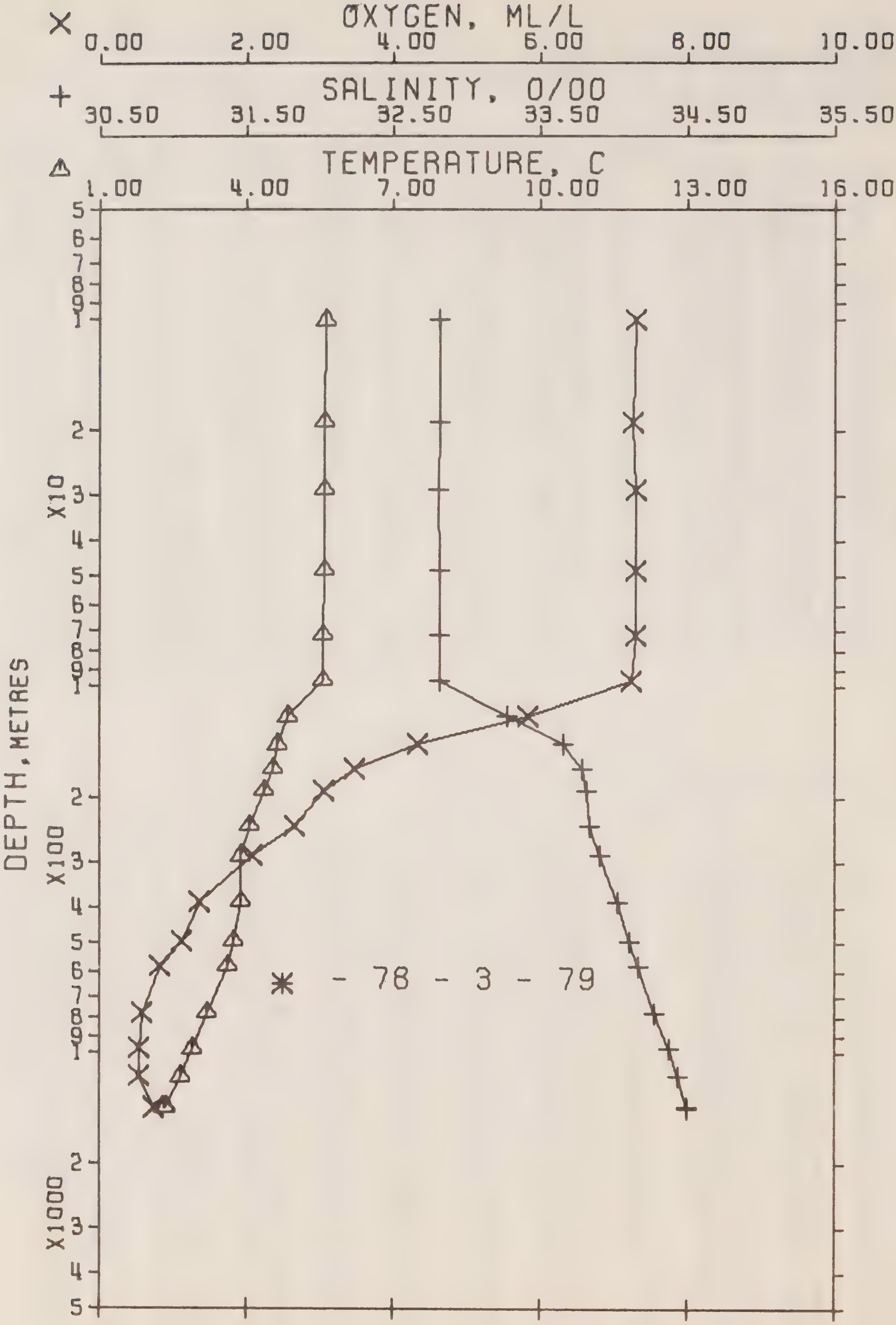
SALINITY, 0/00
30.50 31.50 32.50 33.50 34.50 35.50
TEMPERATURE, C
1.00 4.00 7.00 10.00 13.00 16.00
DEPTH, METRES
X10
X100
X1000
* - 78 - 3 - 73

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 73 DATE 26/ 4/78 GMT 20.7
POSITION 50- .0 N, 145- .0 W STATION P
OBSERVED DATA

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	5.95	32.813	0	25.856	215.2	5.95	215.2	.00	.00	7.36	1472.
10	5.91	32.809	10	25.858	215.2	5.91	215.0	.22	.01	7.37	1472.
19	5.88	32.808	19	25.861	215.0	5.88	214.8	.41	.04	7.31	1472.
29	5.88	32.813	29	25.865	214.7	5.88	214.4	.63	.09	7.34	1472.
48	5.71	32.823	48	25.893	212.2	5.71	211.7	1.04	.25	7.47	1472.
73	5.36	32.833	73	25.942	207.8	5.35	207.0	1.57	.59	7.36	1471.
98	5.19	33.181*	97	26.237	180.1	5.18	179.0	2.04	1.00	6.29*	1471.
123	4.74	33.463	122	26.510	154.3	4.73	153.0	2.46	1.47	5.43	1470.
148	4.67	33.712	147	26.715	135.2	4.66	133.6	2.82	1.97	4.20	1470.
174	4.46	33.805	173	26.811	126.2	4.45	124.4	3.17	2.53	3.49	1470.
199	4.29	33.829	198	26.848	122.8	4.28	120.9	3.48	3.13	3.05	1470.
251	4.03	33.829	249	26.875	120.6	4.01	118.3	4.11	4.56	2.52	1469.
302	3.89	33.828	300	26.889	119.6	3.87	117.0	4.72	6.30	2.01	1470.
405	3.84	34.040	402	27.062	104.1	3.81	100.5	5.88	10.46	1.47	1472.
503	3.74	34.135	499	27.148	96.7	3.70	92.4	6.86	14.99	1.23	1473.
597	3.55	34.200	592	27.218	90.6	3.51	85.6	7.74	19.92	.90	1474.
803	3.09	34.323	796	27.359	78.0	3.04	72.1	9.47	32.24	.57	1475.
1004	2.81	34.397	994	27.443	70.8	2.74	64.1	10.95	45.91	.55	1477.
1204	2.56	34.448	1192	27.506	65.4	2.48	58.1	12.32	61.25	.59	1480.
1507	2.29*	34.521	1490	27.587	58.5	2.18	50.2	14.18	87.05	.86	1484.
2015	1.93	34.599	1990	27.678	50.7	1.79	41.4	16.96	136.82	1.46	1491.
2525	1.72	34.635	2491	27.723	47.3	1.54	36.9	19.44	194.24	2.12	1498.
3038	1.60	34.664	2994	27.755	45.2	1.37	33.6	21.81	261.34	2.64	1507.
3554	1.51	34.671	3498	27.767	44.8	1.23	32.1	24.12	339.00	3.08	1515.
4070	1.54	34.683	4001	27.775	45.7	1.21	31.1	26.45	429.44	3.32	1524.
4172	1.53	34.685	4101	27.777	45.7	1.19	30.8	26.92	449.17	3.38	1526.
4266	1.51	34.696	4192	27.787	44.8	1.16	29.7	27.34	467.21	3.37	1527.
4276	1.50	34.685+	4202	27.779	45.4	1.15	30.5	27.38	469.22	3.52	1527.

INTERPOLATED TO STANDARD PRESSURE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	5.95	32.813	0	25.856	215.2	5.95	215.2	.00	.00	7.36	1472.
10	5.91	32.809	10	25.858	215.2	5.91	215.0	.22	.01	7.37	1472.
20	5.88	32.809	20	25.861	215.0	5.88	214.7	.43	.04	7.32	1472.
30	5.87	32.814	30	25.867	214.6	5.87	214.2	.65	.10	7.34	1472.
50	5.68	32.824	50	25.897	211.9	5.68	211.3	1.07	.27	7.46	1472.
75	5.35	32.858	75	25.964	205.8	5.34	205.0	1.60	.61	7.28	1471.
100	5.14	33.210	99	26.265	177.4	5.14	176.3	2.08	1.04	6.20	1471.
125	4.73	33.486	124	26.529	152.5	4.72	151.2	2.49	1.51	5.32	1470.
150	4.65	33.720	149	26.723	134.4	4.64	132.9	2.85	2.01	4.15	1470.
175	4.45	33.806	174	26.812	126.1	4.44	124.3	3.18	2.55	3.47	1470.
200	4.29	33.829	199	26.849	122.8	4.27	120.9	3.49	3.14	3.04	1470.
225	4.15	33.829	223	26.863	121.6	4.14	119.5	3.79	3.80	2.77	1470.
250	4.03	33.829	248	26.875	120.6	4.02	118.4	4.09	4.53	2.53	1470.
300	3.90	33.828	298	26.888	119.7	3.87	117.1	4.69	6.22	2.03	1470.
400	3.84	34.031	397	27.054	104.8	3.81	101.2	5.83	10.24	1.49	1471.
500	3.74	34.132	496	27.145	96.9	3.71	92.6	6.83	14.83	1.24	1473.
600	3.54	34.202	595	27.220	90.4	3.50	85.4	7.76	20.08	.89	1474.
700	3.30	34.266	694	27.294	83.8	3.26	78.4	8.63	25.84	.72	1474.
800	3.10	34.321	793	27.357	78.2	3.04	72.3	9.44	32.03	.58	1475.
900	2.95	34.361	891	27.402	74.3	2.89	68.0	10.20	38.62	.56	1476.
1000	2.81	34.396	990	27.442	70.9	2.75	64.2	10.93	45.64	.55	1477.
1200	2.56	34.447	1188	27.505	65.5	2.48	58.2	12.29	60.90	.59	1480.
1500	2.29	34.520	1483	27.586	58.6	2.19	50.4	14.15	86.45	.85	1484.
2000	1.94	34.597	1976	27.676	50.9	1.80	41.6	16.89	135.30	1.45	1490.
2500	1.73	34.633	2467	27.721	47.4	1.55	37.1	19.33	191.21	2.09	1498.
3000	1.61	34.662	2956	27.753	45.3	1.39	33.8	21.64	256.00	2.60	1506.
3500	1.52	34.670	3445	27.766	44.8	1.25	32.3	23.88	330.30	3.03	1514.
4000	1.54	34.681	3933	27.774	45.6	1.21	31.2	26.13	416.35	3.29	1523.
4100	1.54	34.684	4030	27.775	45.7	1.20	31.0	26.59	435.20	3.34	1525.
4200	1.52	34.688	4128	27.780	45.4	1.18	30.5	27.04	454.53	3.38	1526.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6.00
8.00
10.00
SALINITY, 0/00
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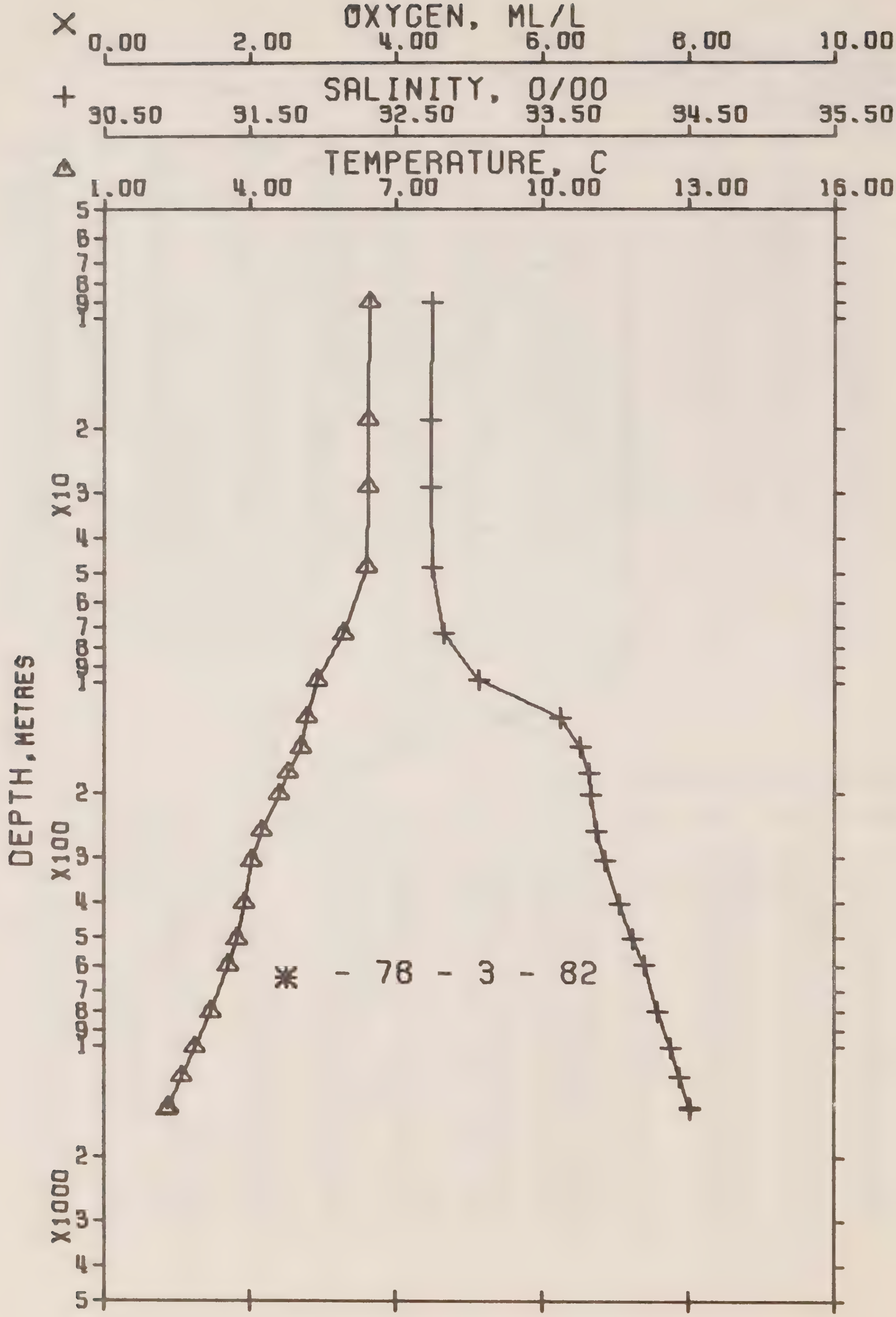
31.50
32.50
33.50
34.50
35.50
TEMPERATURE, C
1.00
4.00
7.00
10.00
13.00
16.00
DEPTH, METRES
X10
X100
X1000
✱ - 78 - 3 - 79

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 79 DATE 3/ 5/78 GMT 19.5
POSITION 50- .0 N, 145- .0 W STATION P
OBSERVED DATA

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	5.66	32.818	0	25.895	211.5	5.66	211.5	.00	.00	7.31	1471.
10	5.61	32.818	10	25.901	211.1	5.61	210.9	.21	.01	7.30	1471.
19	5.59	32.819	19	25.905	210.8	5.59	210.6	.40	.04	7.26	1471.
29	5.59	32.815	29	25.901	211.3	5.59	210.9	.62	.09	7.30	1471.
48	5.59	32.820	48	25.905	211.1	5.59	210.5	1.02	.25	7.30	1471.
72	5.57	32.818	72	25.906	211.3	5.56	210.4	1.53	.57	7.30	1472.
97	5.57	32.825	96	25.912	211.0	5.56	209.9	2.05	1.01	7.24	1472.
121	4.83	33.282	120	26.357	168.8	4.82	167.6	2.51	1.52	5.85	1470.
144	4.64	33.662	143	26.679	138.5	4.63	137.0	2.86	2.00	4.34	1470.
168	4.54	33.791	167	26.792	128.0	4.53	126.3	3.18	2.51	3.48	1470.
192	4.35	33.817	191	26.833	124.3	4.34	122.4	3.49	3.07	3.06	1470.
241	4.06	33.842	239	26.883	119.8	4.04	117.6	4.08	4.37	2.66	1469.
290	3.89	33.907	288	26.952	113.6	3.87	111.1	4.66	5.93	2.08	1470.
389	3.87	34.029	386	27.050	105.1	3.84	101.6	5.74	9.67	1.36	1471.
499	3.72	34.114	495	27.133	98.1	3.68	93.7	6.85	14.72	1.11	1473.
584	3.60	34.167	579	27.187	93.5	3.56	88.6	7.67	19.20	.82	1474.
784	3.20	34.277	777	27.312	82.5	3.15	76.6	9.42	31.42	.58	1475.
981	2.89	34.377	972	27.420	73.0	2.82	66.3	10.95	45.16	.54	1477.
1171	2.65	34.437	1159	27.489	67.0	2.57	59.6	12.28	59.68	.54	1480.
1420	2.34	34.499	1405	27.565	60.3	2.24	52.4	13.85	80.50	.75	1482.
1428	2.32	34.498	1413	27.566	60.2	2.22	52.3	13.90	81.21	.74	1482.

INTERPOLATED TO STANDARD PRESSURE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	5.66	32.818	0	25.895	211.5	5.66	211.5	.00	.00	7.31	1471.
10	5.61	32.818	10	25.901	211.1	5.61	210.9	.21	.01	7.30	1471.
20	5.59	32.819	20	25.904	210.9	5.59	210.7	.42	.04	7.26	1471.
30	5.59	32.815	30	25.902	211.2	5.59	210.9	.63	.10	7.30	1471.
50	5.59	32.820	50	25.905	211.1	5.58	210.5	1.06	.27	7.30	1471.
75	5.57	32.819	75	25.907	211.2	5.56	210.4	1.58	.61	7.29	1472.
100	5.46	32.895	99	25.980	204.5	5.45	203.4	2.12	1.08	7.03	1472.
125	4.79	33.356	124	26.419	162.9	4.78	161.6	2.58	1.61	5.55	1470.
150	4.61	33.696	149	26.708	135.8	4.60	134.2	2.95	2.12	4.11	1470.
175	4.48	33.799	174	26.804	126.9	4.47	125.2	3.27	2.66	3.36	1470.
200	4.30	33.821	199	26.841	123.5	4.29	121.6	3.58	3.26	2.99	1470.
225	4.15	33.834	223	26.868	121.2	4.13	119.1	3.89	3.92	2.78	1470.
250	4.03	33.855	248	26.897	118.6	4.01	116.3	4.19	4.65	2.54	1470.
300	3.89	33.921	298	26.963	112.7	3.87	110.0	4.77	6.26	2.00	1470.
400	3.85	34.038	397	27.060	104.3	3.83	100.8	5.85	10.13	1.33	1471.
500	3.72	34.115	496	27.133	98.0	3.68	93.7	6.86	14.76	1.11	1473.
600	3.56	34.177	595	27.198	92.5	3.52	87.5	7.81	20.10	.80	1474.
700	3.35	34.235	694	27.264	86.7	3.31	81.2	8.71	26.03	.67	1475.
800	3.17	34.286	793	27.322	81.6	3.12	75.7	9.55	32.47	.58	1475.
900	3.01	34.338	891	27.379	76.6	2.95	70.2	10.34	39.32	.55	1476.
1000	2.86	34.383	990	27.428	72.4	2.80	65.6	11.09	46.52	.54	1478.
1200	2.61	34.445	1188	27.499	66.2	2.53	58.7	12.47	62.02	.57	1480.

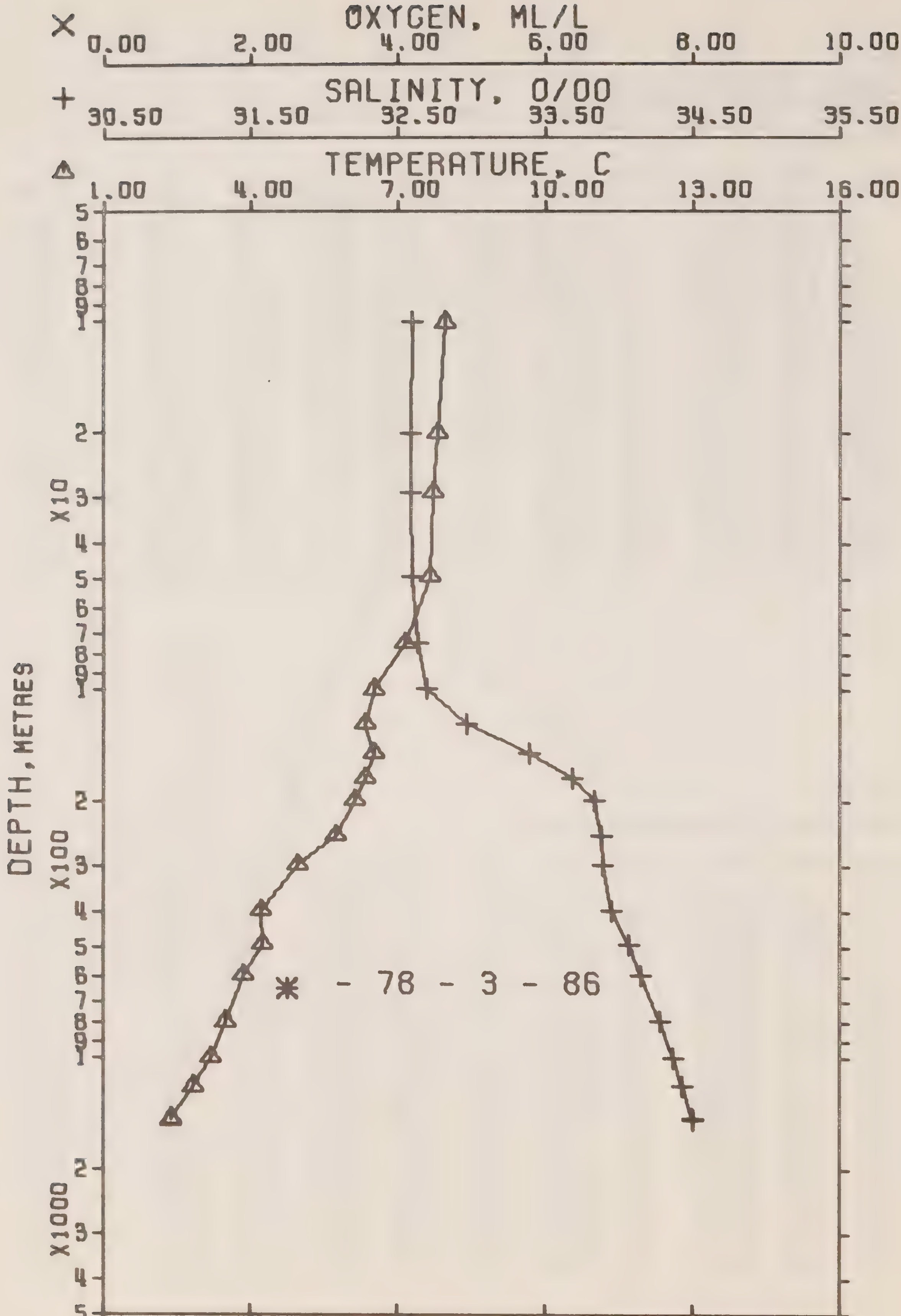

OXYGEN, ML/L
0.00
2.00
4.00
6.00
8.00
10.00
SALINITY, 0/00
30.50
31.50
32.50
33.50
34.50
35.50
TEMPERATURE, C
1.00
4.00
7.00
10.00
13.00
16.00
DEPTH, METRES
X10
X100
X1000
* - 78 - 3 - 82

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 82 DATE 7/ 4/78 GMT 23.5
POSITION 49-49.0 N, 142-40.0 W STATION 12
OBSERVED DATA

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	6.49	32.749	0	25.738	226.4	6.49	226.4	.00	.00		1474.
9	6.46	32.750	9	25.743	226.1	6.46	226.0	.20	.01		1474.
19	6.43	32.744	19	25.742	226.3	6.43	226.1	.43	.04		1474.
29	6.43	32.745	29	25.743	226.4	6.43	226.0	.66	.10		1474.
48	6.39	32.754	48	25.755	225.4	6.39	224.8	1.09	.27		1474.
73	5.92	32.835	73	25.877	214.0	5.91	213.1	1.65	.61		1473.
99	5.39	33.071	98	26.127	190.6	5.38	189.4	2.16	1.06		1472.
125	5.18	33.619	124	26.584	147.5	5.17	146.0	2.60	1.56		1472.
151	5.06	33.757	150	26.707	136.1	5.05	134.4	2.97	2.08		1472.
177	4.77	33.818	176	26.788	128.6	4.76	126.7	3.32	2.66		1471.
203	4.60	33.830	202	26.816	126.1	4.58	124.0	3.65	3.31		1471.
257	4.23	33.867	255	26.885	119.9	4.21	117.4	4.31	4.85		1470.
309	4.02	33.928	307	26.955	113.6	4.00	110.7	4.92	6.61		1471.
406	3.89	34.035	403	27.053	105.0	3.86	101.4	5.98	10.47		1472.
510	3.72	34.122	506	27.139	97.5	3.68	93.1	7.03	15.38		1473.
603	3.55	34.200	598	27.218	90.6	3.51	85.6	7.90	20.34		1474.
808	3.19	34.291	801	27.325	81.5	3.13	75.4	9.66	32.97		1476.
1016	2.87	34.378	1006	27.423	72.9	2.80	66.0	11.26	47.81		1478.
1219	2.60	34.443	1206	27.499	66.3	2.52	58.8	12.67	63.83		1480.
1490	2.31	34.507	1474	27.574	59.7	2.21	51.5	14.36	87.18		1483.
1499	2.30	34.507	1483	27.575	59.6	2.20	51.4	14.42	88.01		1484.

INTERPOLATED TO STANDARD PRESSURE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	6.49	32.749	0	25.738	226.4	6.49	226.4	.00	.00		1474.
10	6.46	32.749	10	25.743	226.1	6.46	226.0	.23	.01		1474.
20	6.43	32.744	20	25.742	226.3	6.43	226.1	.45	.05		1474.
30	6.43	32.745	30	25.744	226.3	6.43	225.9	.68	.10		1474.
50	6.35	32.761	50	25.765	224.5	6.35	223.8	1.13	.29		1474.
75	5.88	32.851	75	25.895	212.4	5.88	211.5	1.68	.64		1473.
100	5.38	33.103	99	26.153	188.1	5.37	186.9	2.19	1.09		1472.
125	5.18	33.619	124	26.584	147.5	5.17	146.0	2.60	1.56		1472.
150	5.06	33.752	149	26.702	136.5	5.05	134.8	2.96	2.06		1472.
175	4.79	33.813	174	26.781	129.2	4.78	127.3	3.29	2.61		1471.
200	4.62	33.829	199	26.812	126.4	4.61	124.3	3.61	3.22		1471.
225	4.44	33.846	223	26.846	123.4	4.42	121.1	3.92	3.90		1471.
250	4.27	33.863	248	26.877	120.6	4.26	118.2	4.22	4.63		1471.
300	4.05	33.918	298	26.943	114.6	4.03	111.8	4.81	6.28		1471.
400	3.90	34.029	397	27.048	105.5	3.87	101.9	5.91	10.20		1472.
500	3.74	34.114	496	27.132	98.2	3.70	93.9	6.93	14.86		1473.
600	3.56	34.198	595	27.215	90.9	3.51	85.9	7.88	20.16		1474.
700	3.37	34.246	694	27.272	86.0	3.32	80.4	8.76	26.00		1475.
800	3.20	34.288	793	27.321	81.8	3.15	75.8	9.59	32.41		1476.
900	3.04	34.332	892	27.371	77.4	2.98	71.0	10.39	39.31		1477.
1000	2.89	34.372	990	27.416	73.5	2.82	66.6	11.15	46.62		1478.
1200	2.62	34.438	1188	27.492	66.8	2.54	59.4	12.55	62.31		1480.


OXYGEN, ML/L
0.00 2.00 4.00 6.00 8.00 10.00
SALINITY, O/OO
30.50 31.50 32.50 33.50 34.50 35.50
TEMPERATURE, C
1.00 4.00 7.00 10.00 13.00 16.00
DEPTH, METRES
X10
X100
X1000
* - 78 - 3 - 86

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 86 DATE 8/ 5/78 GMT 20.5
POSITION 49-26.0 N, 136-40.0 W STATION 9
OBSERVED DATA

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	8.06	32.597	0	25.404	258.3	8.06	258.3	.00	.00		1480.
10	7.97	32.598	10	25.418	257.1	7.97	256.9	.26	.01		1480.
20	7.81	32.592	20	25.436	255.5	7.81	255.2	.52	.05		1479.
29	7.73	32.593	29	25.448	254.5	7.73	254.0	.75	.11		1479.
49	7.66	32.604	49	25.467	253.0	7.66	252.2	1.26	.32		1479.
74	7.14	32.637	74	25.564	244.0	7.13	242.9	1.89	.71		1478.
100	6.53	32.703	99	25.697	231.6	6.52	230.3	2.49	1.24		1476.
124	6.33	32.970	123	25.933	209.5	6.32	207.9	3.02	1.85		1476.
149	6.51	33.388	148	26.238	180.9	6.50	178.8	3.51	2.53		1477.
174	6.33	33.678	173	26.490	157.4	6.31	154.9	3.94	3.23		1477.
200	6.14	33.830	199	26.634	144.0	6.12	141.2	4.33	3.98		1477.
250	5.74	33.880	248	26.723	136.0	5.72	132.7	5.02	5.56		1477.
300	4.96	33.888	298	26.822	126.7	4.94	123.3	5.68	7.42		1474.
400	4.21	33.949	397	26.952	114.8	4.18	110.9	6.88	11.69		1473.
494	4.23	34.070	490	27.046	106.8	4.19	102.0	7.92	16.43		1475.
599	3.84	34.147	594	27.147	97.7	3.80	92.3	8.99	22.39		1475.
803	3.50	34.281	796	27.287	85.6	3.44	78.9	10.85	35.68		1477.
1007	3.18	34.366	997	27.385	77.1	3.11	69.5	12.50	50.88		1479.
1205	2.83	34.431	1193	27.469	69.7	2.75	61.5	13.96	67.29		1481.
1477	2.38	34.504	1461	27.566	60.7	2.28	52.3	15.72	91.28		1484.
1485	2.37	34.505	1469	27.567	60.5	2.27	52.1	15.77	92.02		1484.

INTERPOLATED TO STANDARD PRESSURE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	8.06	32.597	0	25.404	258.3	8.06	258.3	.00	.00		1480.
10	7.97	32.598	10	25.418	257.1	7.97	256.9	.26	.01		1480.
20	7.81	32.592	20	25.436	255.5	7.81	255.2	.52	.05		1479.
30	7.73	32.594	30	25.449	254.4	7.72	253.9	.77	.12		1479.
50	7.64	32.605	50	25.470	252.7	7.64	251.9	1.28	.32		1479.
75	7.12	32.639	75	25.568	243.7	7.12	242.6	1.90	.72		1478.
100	6.53	32.703	99	25.697	231.6	6.52	230.3	2.49	1.24		1476.
125	6.34	32.992	124	25.949	208.0	6.33	206.3	3.04	1.88		1476.
150	6.50	33.401	149	26.249	179.9	6.49	177.7	3.53	2.56		1477.
175	6.32	33.683	174	26.495	156.9	6.31	154.4	3.95	3.26		1477.
200	6.14	33.830	199	26.634	144.0	6.12	141.2	4.33	3.98		1477.
225	5.93	33.856	223	26.681	139.8	5.91	136.7	4.68	4.74		1477.
250	5.74	33.880	248	26.723	136.0	5.72	132.7	5.02	5.56		1477.
300	4.96	33.888	298	26.822	126.7	4.94	123.3	5.68	7.42		1474.
400	4.21	33.949	397	26.952	114.8	4.18	110.9	6.88	11.69		1473.
500	4.21	34.075	496	27.052	106.2	4.17	101.4	7.98	16.75		1475.
600	3.84	34.148	595	27.148	97.6	3.79	92.2	9.00	22.45		1475.
700	3.66	34.218	694	27.222	91.2	3.61	85.2	9.94	28.70		1476.
800	3.50	34.279	793	27.285	85.7	3.45	79.1	10.83	35.45		1477.
900	3.34	34.324	892	27.337	81.3	3.27	74.2	11.66	42.68		1478.
1000	3.19	34.364	990	27.382	77.4	3.12	69.8	12.45	50.36		1479.
1200	2.84	34.429	1188	27.467	69.8	2.75	61.7	13.93	66.85		1481.

Results of STD Observations

(P-78-3)

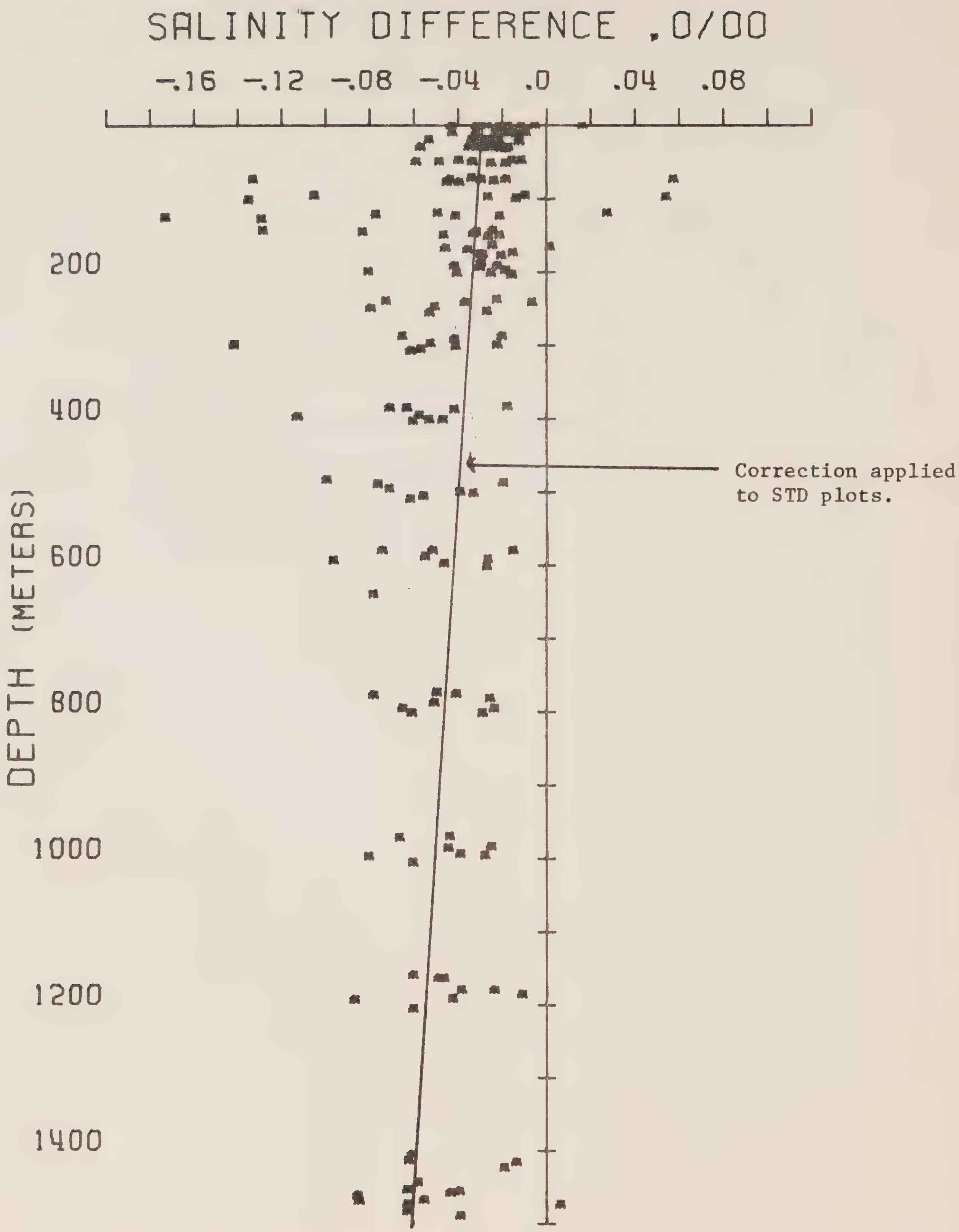


Figure 7. Salinity difference between hydro data and STD.

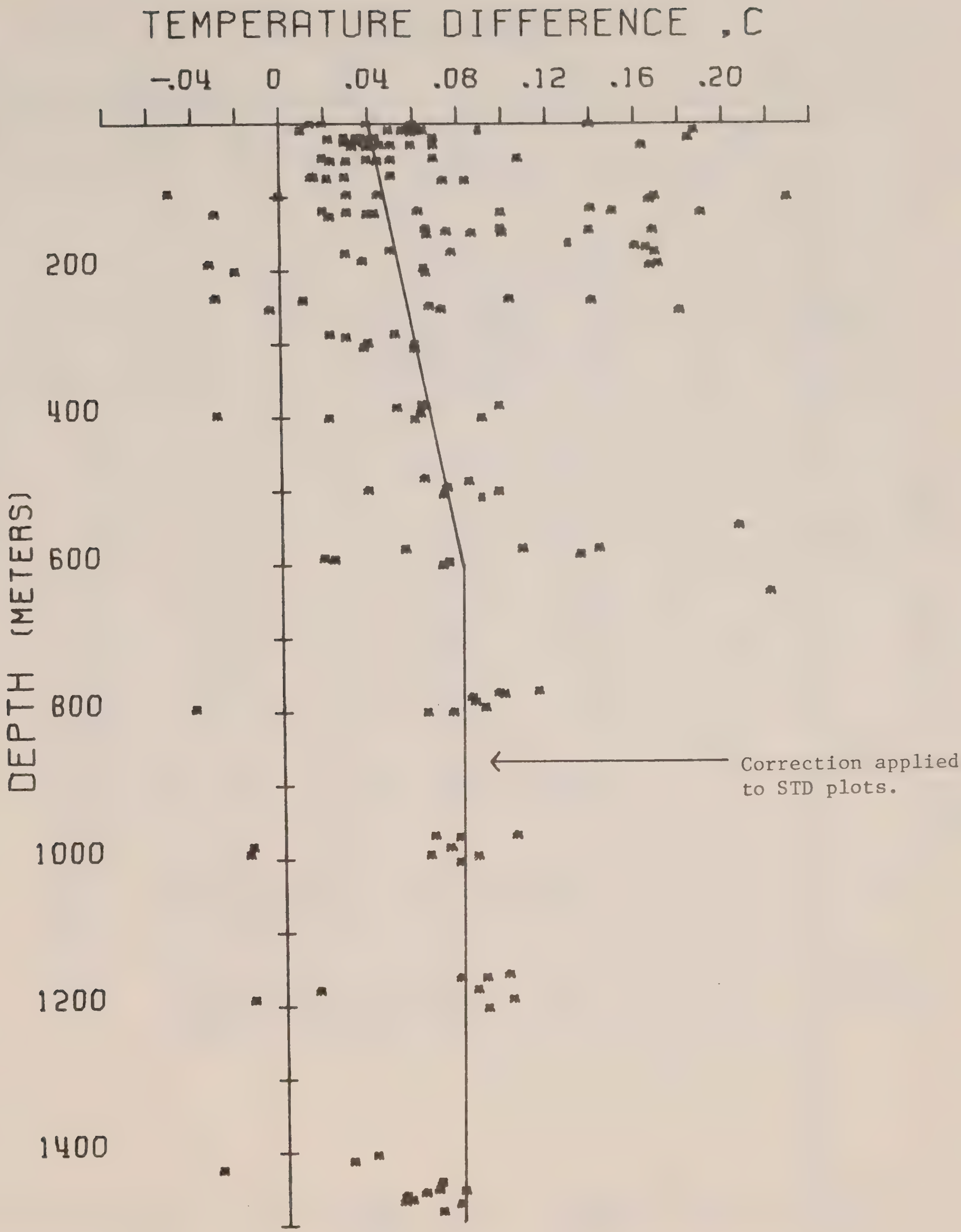
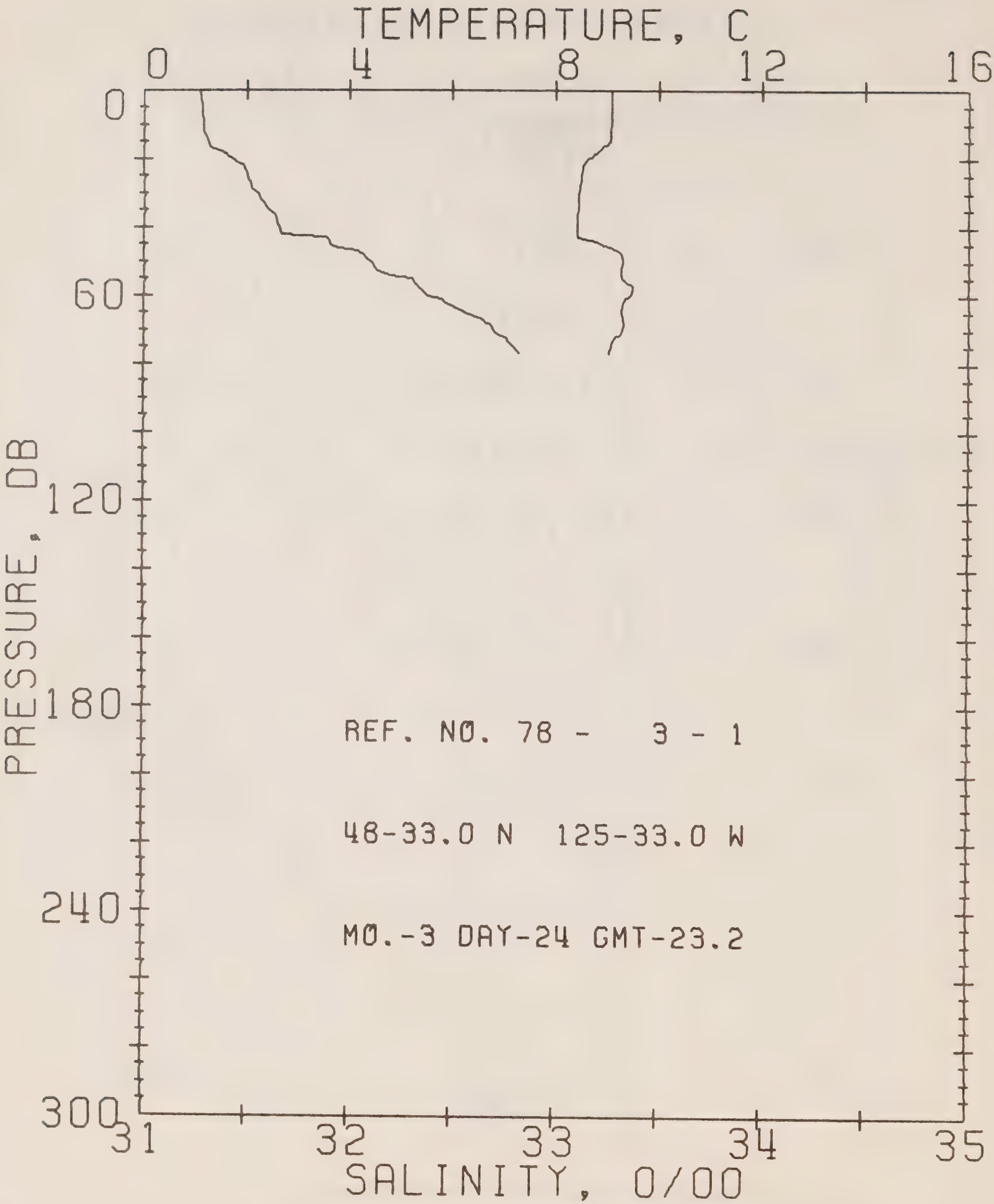


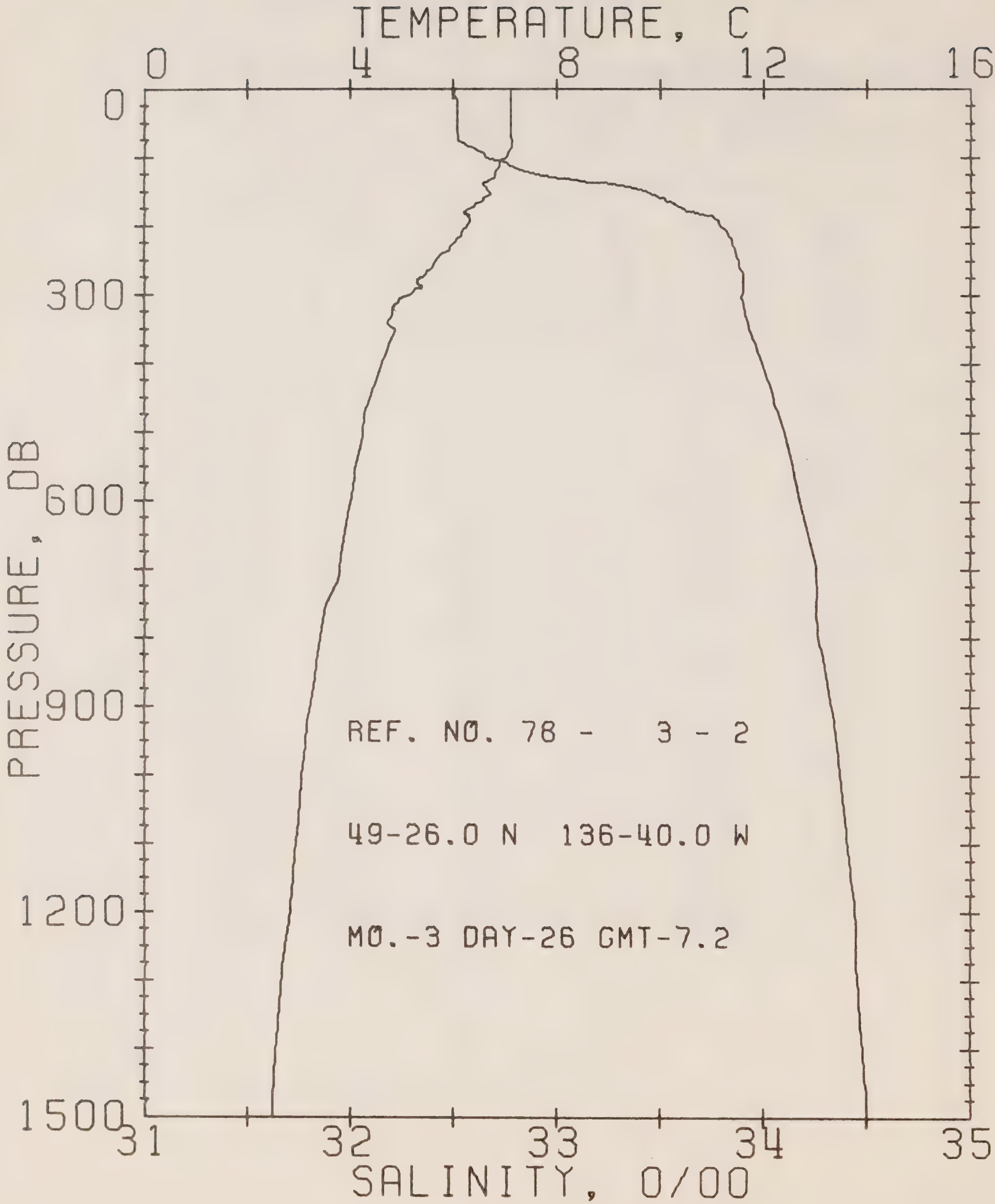
Figure 8. Temperature difference between hydro data and STD.


TEMPERATURE, C
0
4
8
12
16
0
60
120
180
240
300
PRESSURE, DB
REF. NO. 78 - 3 - 1
48-33.0 N 125-33.0 W
MO.-3 DAY-24 GMT-23.2
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 1 DATE 24/ 3/78 STATION 1
POSITION 48-33.0N, 125-33.0W GMT 23.2
RESULTS OF STP CAST 44 POINTS TAKEN FROM ANALOG TRACE

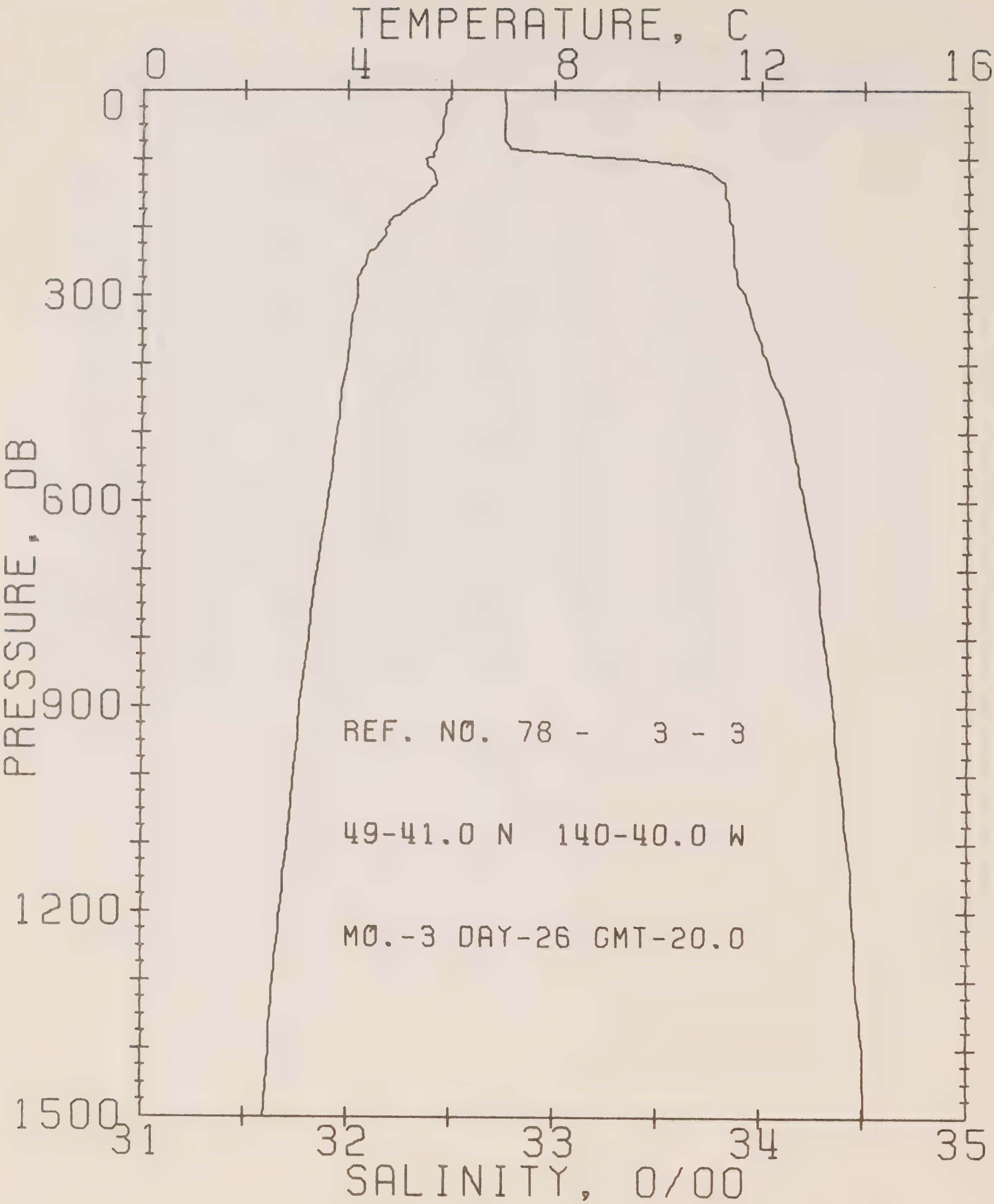
PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	9.09	31.27	0	24.21	371.6	0.0	0.0	1482.
10	9.08	31.29	10	24.23	370.4	0.37	0.02	1482.
20	8.63	31.43	20	24.41	353.6	0.74	0.07	1481.
30	8.47	31.54	30	24.52	342.9	1.08	0.16	1481.
50	9.32	32.10	50	24.82	314.5	1.74	0.43	1485.
75	9.08	32.80	75	25.41	259.4	2.46	0.88	1485.

DEPTH	TEMP	SAL	DEPTH	TEMP	SAL
0.	9.09	31.27	46.	9.13	31.95
5.	9.09	31.28	47.	9.21	32.04
7.	9.09	31.28	48.	9.28	32.07
10.	9.08	31.29	50.	9.32	32.10
12.	9.07	31.29	53.	9.28	32.14
15.	9.06	31.31	54.	9.28	32.20
17.	8.91	31.32	55.	9.27	32.30
18.	8.82	31.38	57.	9.47	32.33
20.	8.63	31.43	58.	9.53	32.35
22.	8.54	31.48	60.	9.43	32.38
23.	8.53	31.49	61.	9.37	32.45
26.	8.50	31.51	62.	9.34	32.47
29.	8.48	31.53	63.	9.32	32.50
31.	8.46	31.56	65.	9.27	32.58
32.	8.46	31.57	67.	9.31	32.65
35.	8.45	31.61	69.	9.33	32.69
37.	8.44	31.64	71.	9.27	32.71
39.	8.44	31.65	72.	9.17	32.75
42.	8.44	31.67	74.	9.09	32.78
43.	8.44	31.88	75.	9.08	32.80
44.	8.79	31.90	76.	9.06	32.81
45.	8.96	31.91	77.	9.05	32.82


TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 3 - 2
49-26.0 N 136-40.0 W
MO.-3 DAY-26 GMT-7.2
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 2 DATE 26/ 3/78 STATION 9
POSITION 49-26.0N, 136-40.0W GMT 7.2
RESULTS OF STP CAST 181 POINTS TAKEN FROM ANALOG TRACE

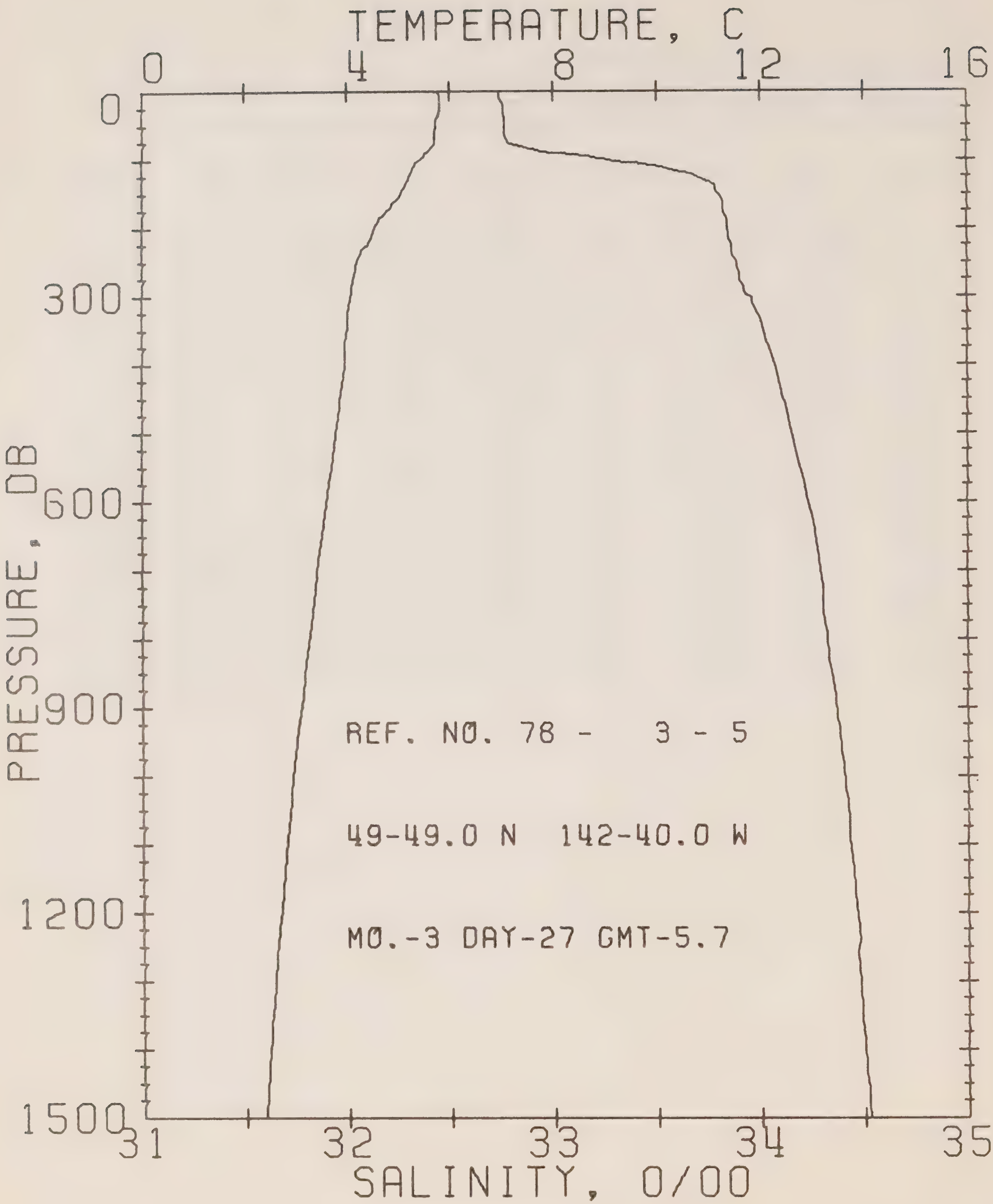
PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.12	32.51	0	25.47	252.2	0.0	0.0	1476.
10	7.12	32.51	10	25.47	252.5	0.25	0.01	1476.
20	7.12	32.52	20	25.48	251.9	0.50	0.05	1477.
30	7.12	32.52	30	25.48	252.0	0.76	0.12	1477.
50	7.12	32.52	50	25.48	252.3	1.26	0.32	1477.
75	7.14	32.53	75	25.48	252.1	1.89	0.72	1478.
100	7.00	32.66	99	25.60	241.0	2.51	1.27	1478.
125	6.80	32.91	124	25.83	219.8	3.08	1.93	1478.
150	6.70	33.43	149	26.25	180.4	3.58	2.62	1478.
175	6.30	33.61	174	26.44	161.9	4.00	3.33	1477.
200	6.25	33.79	199	26.59	148.2	4.39	4.06	1478.
225	5.98	33.85	223	26.67	140.9	4.75	4.84	1477.
250	5.65	33.88	248	26.74	135.0	5.09	5.68	1476.
300	5.15	33.90	298	26.81	128.1	5.75	7.52	1475.
400	4.61	33.99	397	26.94	116.3	6.97	11.35	1475.
500	4.24	34.10	496	27.07	105.0	8.07	16.89	1475.
600	4.00	34.18	595	27.16	97.4	9.08	22.55	1476.
800	3.40	34.26	793	27.28	85.9	10.90	35.47	1476.
1000	3.05	34.37	990	27.40	75.6	12.50	50.15	1478.
1200	2.82	34.44	1188	27.48	68.8	13.94	66.32	1481.
1500	2.47	34.50	1484	27.56	62.1	15.90	93.19	1484.



TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 3 - 3
49-41.0 N 140-40.0 W
MO.-3 DAY-26 GMT-20.0
31
32
33
34
35
SALINITY, 0/00

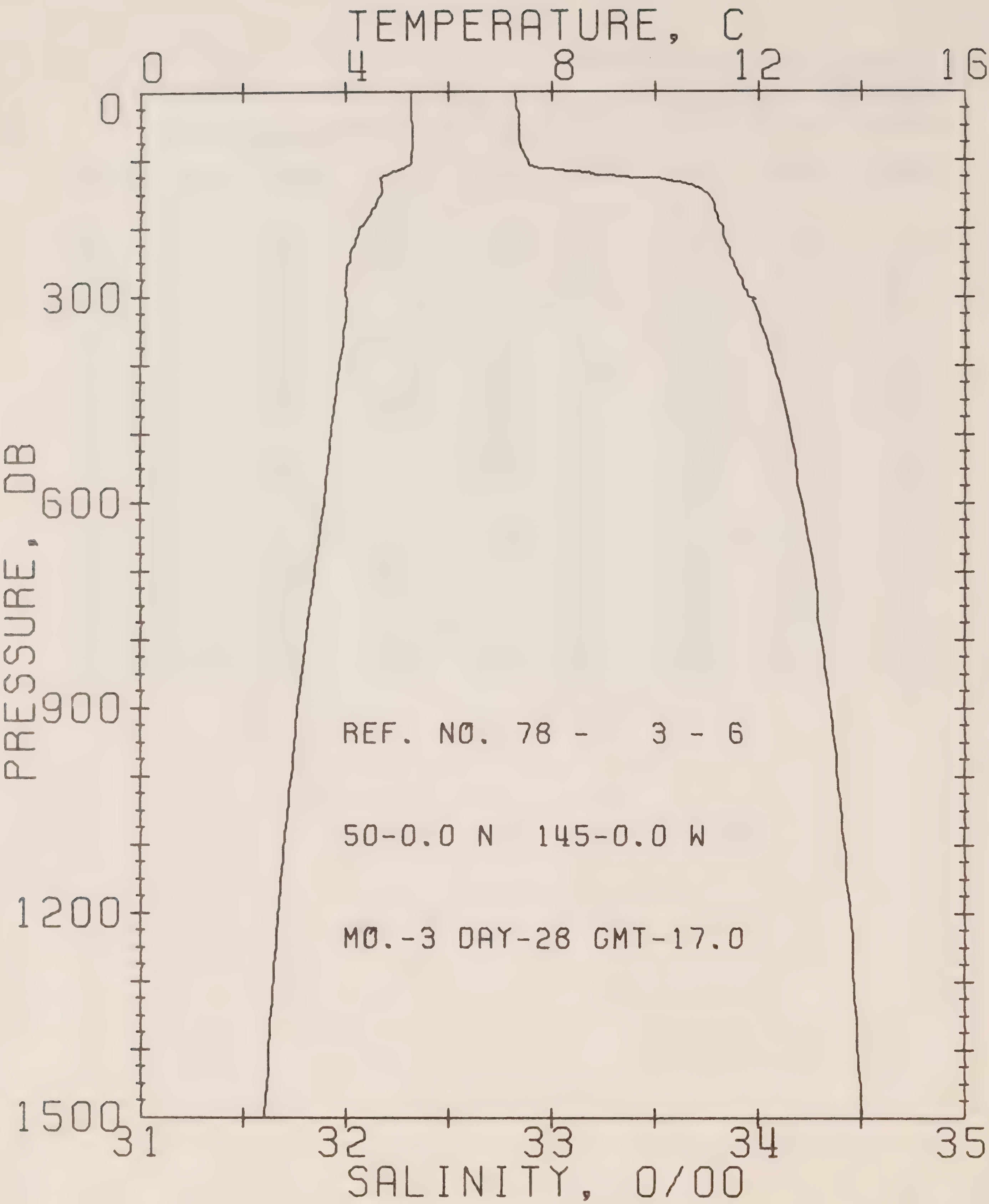
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 3 DATE 26/ 3/78 STATION 11
POSITION 49-41.0N, 140-40.0W GMT 20.0
RESULTS OF STP CAST 175 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	6.00	32.76	0	25.81	219.7	0.0	0.0	1472.
10	5.99	32.76	10	25.81	219.9	0.22	0.01	1472.
20	5.91	32.76	20	25.82	218.8	0.44	0.04	1472.
30	5.90	32.77	30	25.83	218.3	0.66	0.10	1472.
50	5.84	32.76	50	25.83	218.6	1.09	0.28	1472.
75	5.73	32.76	75	25.84	217.5	1.64	0.63	1472.
100	5.55	33.33	99	26.31	173.2	2.15	1.08	1473.
125	5.70	33.77	124	26.65	142.0	2.53	1.51	1474.
150	5.55	33.83	149	26.71	136.4	2.88	2.00	1474.
175	5.12	33.85	174	26.77	130.4	3.21	2.55	1473.
200	4.77	33.86	199	26.82	125.8	3.53	3.16	1472.
225	4.53	33.87	223	26.85	123.2	3.84	3.84	1471.
250	4.35	33.87	248	26.88	120.9	4.15	4.58	1471.
300	4.19	33.92	298	26.93	115.9	4.74	6.24	1471.
400	3.97	34.03	397	27.04	106.3	5.85	10.19	1472.
500	3.78	34.14	496	27.15	96.6	6.86	14.81	1473.
600	3.61	34.21	595	27.22	90.8	7.80	20.06	1474.
800	3.24	34.31	793	27.34	80.6	9.50	32.15	1476.
1000	2.96	34.38	990	27.42	73.4	11.03	46.22	1478.
1200	2.69	34.45	1188	27.50	66.9	12.43	61.86	1480.
1500	2.38	34.51	1484	27.57	60.4	14.33	87.98	1484.


TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 3 - 5
49-49.0 N 142-40.0 W
MO.-3 DAY-27 GMT-5.7
31
32
33
34
35
SALINITY, 0/00

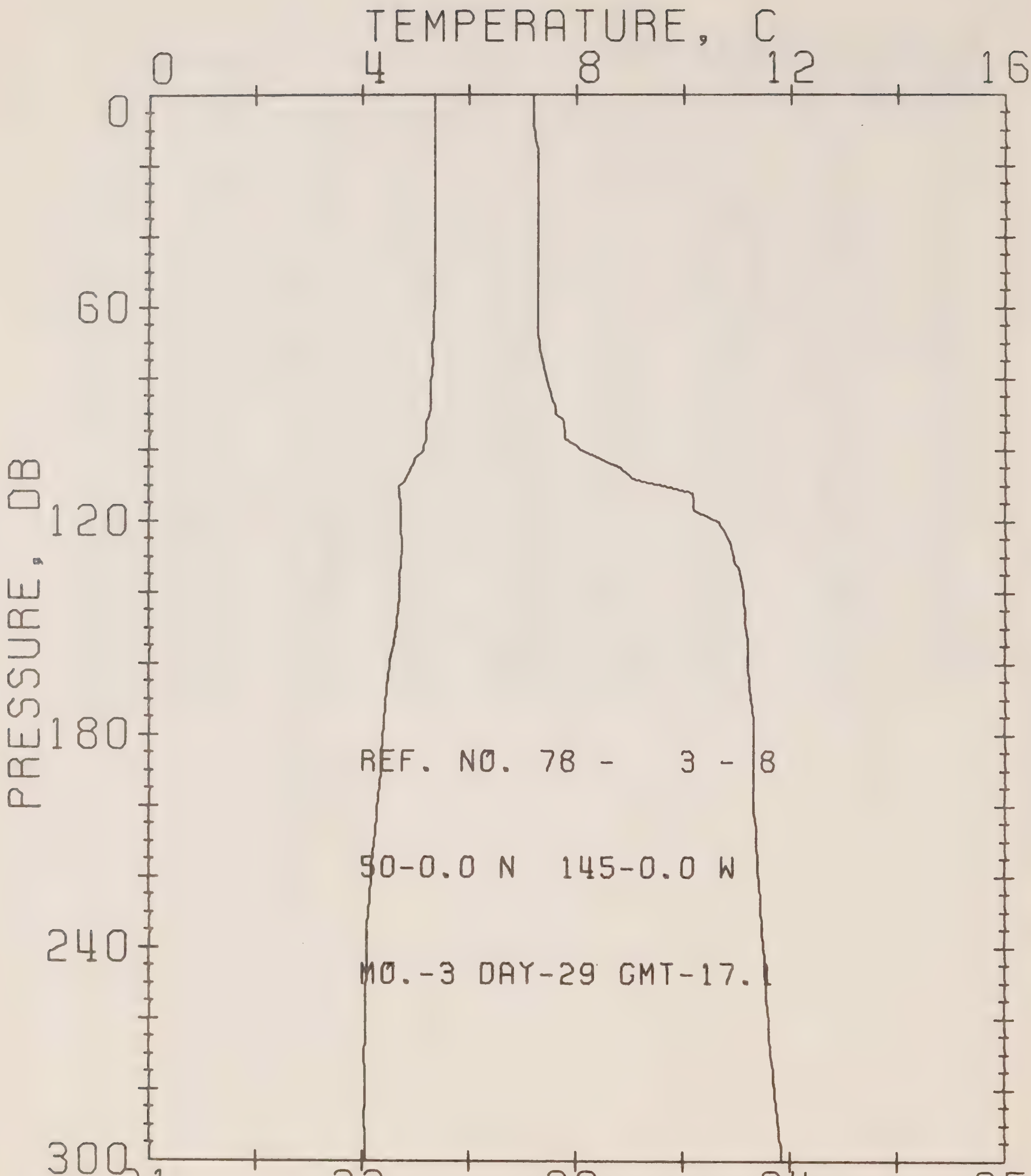
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 5 DATE 27/ 3/78 STATION 12
POSITION 49-49.0N, 142-40.0W GMT 5.7
RESULTS OF STP CAST 138 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.79	32.74	0	25.82	218.8	0.0	0.0	1471.
10	5.80	32.74	10	25.82	219.2	0.22	0.01	1471.
20	5.80	32.76	20	25.83	217.9	0.44	0.04	1472.
30	5.79	32.76	30	25.83	217.9	0.66	0.10	1472.
50	5.73	32.77	50	25.85	216.6	1.09	0.28	1472.
75	5.72	32.79	75	25.87	215.5	1.63	0.62	1472.
100	5.42	33.25	99	26.27	177.3	2.13	1.06	1472.
125	5.21	33.70	124	26.65	141.8	2.52	1.51	1472.
150	5.04	33.79	149	26.74	133.2	2.86	1.99	1472.
175	4.77	33.82	174	26.79	128.5	3.19	2.53	1471.
200	4.53	33.84	199	26.83	124.6	3.50	3.13	1471.
225	4.37	33.86	223	26.87	121.8	3.81	3.80	1471.
250	4.18	33.88	248	26.91	118.0	4.11	4.52	1470.
300	4.06	33.94	298	26.96	113.1	4.69	6.15	1471.
400	3.94	34.07	397	27.08	102.9	5.76	9.97	1472.
500	3.76	34.15	496	27.16	95.9	6.76	14.53	1473.
600	3.58	34.23	595	27.24	88.8	7.68	19.70	1474.
800	3.23	34.32	793	27.35	79.6	9.36	31.52	1476.
1000	2.92	34.40	990	27.44	71.5	10.87	45.45	1478.
1200	2.68	34.46	1188	27.51	65.7	12.24	60.78	1480.
1500	2.36	34.53	1483	27.59	58.8	14.11	86.48	1484.


TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 3 - 6
50-0.0 N 145-0.0 W
MO.-3 DAY-28 GMT-17.0
31
32
33
34
35
SALINITY, 0/00

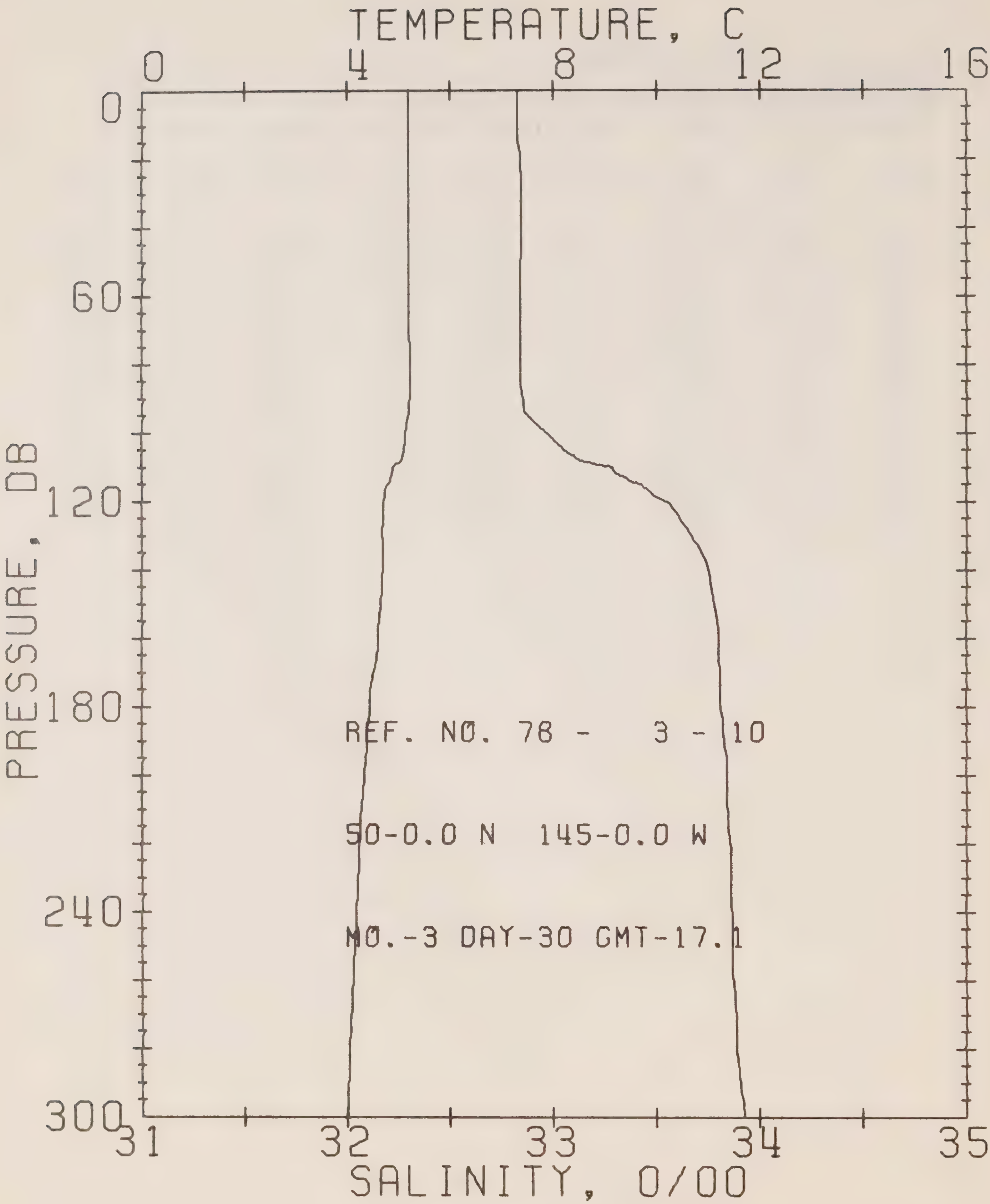
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 6 DATE 28/ 3/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.0
RESULTS OF STP CAST 160 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.29	32.82	0	25.94	207.2	0.0	0.0	1469.
10	5.29	32.82	10	25.94	207.3	0.21	0.01	1469.
20	5.29	32.83	20	25.95	206.9	0.41	0.04	1470.
30	5.29	32.83	30	25.95	206.6	0.62	0.09	1470.
50	5.30	32.84	50	25.96	206.5	1.03	0.26	1470.
75	5.31	32.84	75	25.95	206.9	1.55	0.59	1471.
100	5.29	32.88	99	25.99	203.9	2.06	1.05	1471.
125	4.70	33.41	124	26.47	158.0	2.54	1.59	1470.
150	4.69	33.75	149	26.74	132.6	2.89	2.08	1471.
175	4.51	33.79	174	26.80	127.9	3.21	2.62	1470.
200	4.27	33.83	199	26.85	122.6	3.53	3.22	1470.
225	4.15	33.85	223	26.88	120.4	3.83	3.88	1470.
250	4.05	33.88	248	26.91	117.2	4.13	4.60	1470.
300	4.01	33.95	298	26.98	111.5	4.70	6.20	1470.
400	3.86	34.07	397	27.09	101.9	5.76	9.98	1472.
500	3.70	34.16	496	27.17	94.7	6.75	14.48	1473.
600	3.56	34.21	595	27.23	90.1	7.67	19.65	1474.
800	3.22	34.30	793	27.33	80.8	9.37	31.73	1476.
1000	2.93	34.38	990	27.42	73.1	10.90	45.76	1478.
1200	2.68	34.45	1188	27.50	66.6	12.29	61.35	1480.
1500	2.40	34.51	1483	27.57	60.7	14.21	87.67	1484.


TEMPERATURE, C
0
4
8
12
16
0
60
120
180
240
300
PRESSURE, DB
REF. NO. 78 - 3 - 8
50-0.0 N 145-0.0 W
MO.-3 DAY-29 GMT-17.1
31
32
33
34
35
SALINITY, 0/00

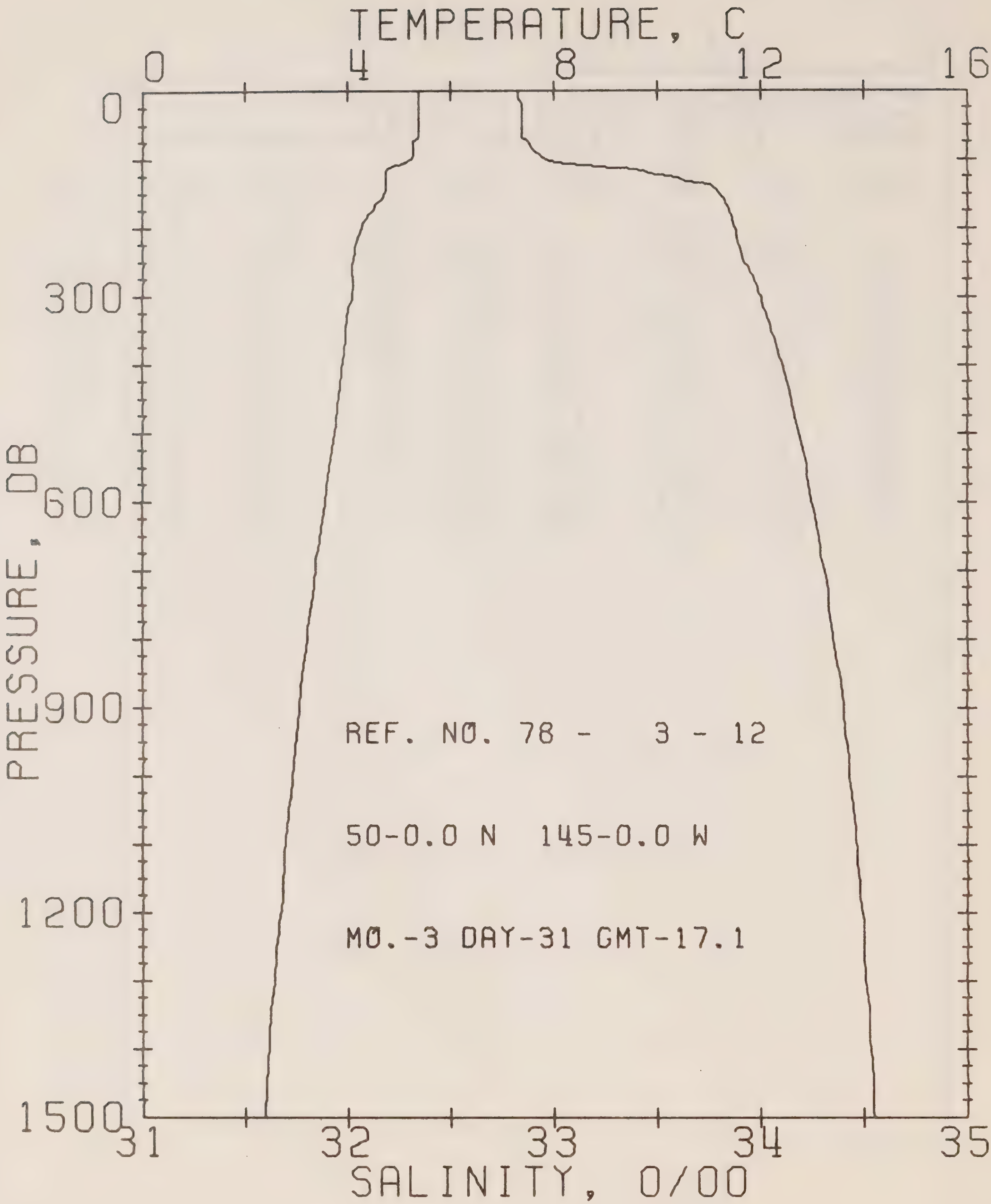
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 8 DATE 29/ 3/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.1
RESULTS OF STP CAST 82 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.36	32.80	0	25.92	209.5	0.0	0.0	1470.
10	5.36	32.80	10	25.92	209.5	0.21	0.01	1470.
20	5.35	32.82	20	25.93	208.3	0.42	0.04	1470.
30	5.35	32.82	30	25.93	208.3	0.63	0.10	1470.
50	5.35	32.82	50	25.93	208.5	1.04	0.27	1470.
75	5.33	32.84	75	25.95	207.1	1.56	0.60	1471.
100	5.15	33.02	99	26.12	191.9	2.07	1.05	1471.
125	4.74	33.71	124	26.71	135.9	2.46	1.49	1470.
150	4.62	33.79	149	26.79	128.7	2.79	1.95	1470.
175	4.41	33.83	174	26.84	124.0	3.11	2.48	1470.
200	4.27	33.83	199	26.85	122.6	3.41	3.07	1470.
225	4.13	33.86	223	26.89	119.3	3.72	3.72	1470.
250	4.06	33.89	248	26.92	116.8	4.01	4.44	1470.
300	4.06	33.96	298	26.98	111.6	4.58	6.03	1471.


TEMPERATURE, C
0
4
8
12
16
PRESSURE, DB
0
60
120
180
240
300
REF. NO. 78 - 3 - 10
50-0.0 N 145-0.0 W
MO.-3 DAY-30 GMT-17.1
31
32
33
34
35
SALINITY, 0/00

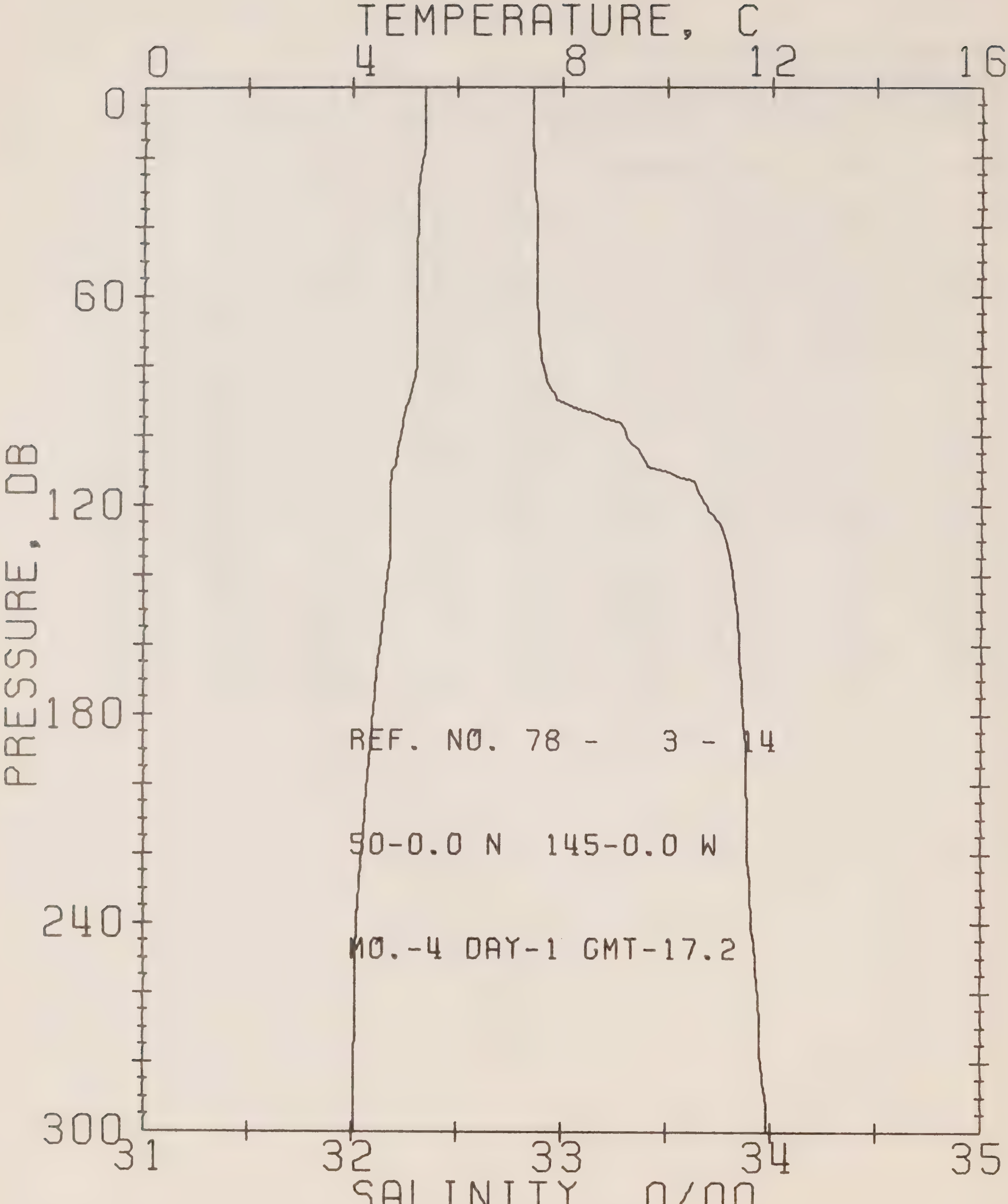
OFFSHORE OCEANOGRAPHY GROUP
REFFRENCE NO. 78- 3- 10 DATE 30/ 3/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.1
RESULTS OF STP CAST 81 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.21	32.83	0	25.96	205.6	0.0	0.0	1469.
10	5.21	32.83	10	25.96	205.9	0.21	0.01	1469.
20	5.21	32.84	20	25.97	205.2	0.41	0.04	1469.
30	5.21	32.85	30	25.97	204.6	0.62	0.09	1470.
50	5.21	32.84	50	25.97	205.2	1.03	0.26	1470.
75	5.22	32.84	75	25.97	205.9	1.54	0.59	1470.
100	5.14	32.96	99	26.07	196.1	2.05	1.04	1470.
125	4.69	33.61	124	26.63	143.0	2.47	1.52	1470.
150	4.63	33.78	149	26.77	130.0	2.81	1.99	1470.
175	4.44	33.81	174	26.82	125.7	3.13	2.52	1470.
200	4.32	33.84	199	26.86	122.4	3.44	3.11	1470.
225	4.21	33.86	223	26.88	120.0	3.74	3.77	1470.
250	4.12	33.87	248	26.90	118.5	4.04	4.49	1470.
300	4.00	33.93	298	26.96	113.2	4.62	6.12	1470.


TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 3 - 12
50-0.0 N 145-0.0 W
MO.-3 DAY-31 GMT-17.1
31
32
33
34
35
SALINITY, 0/00

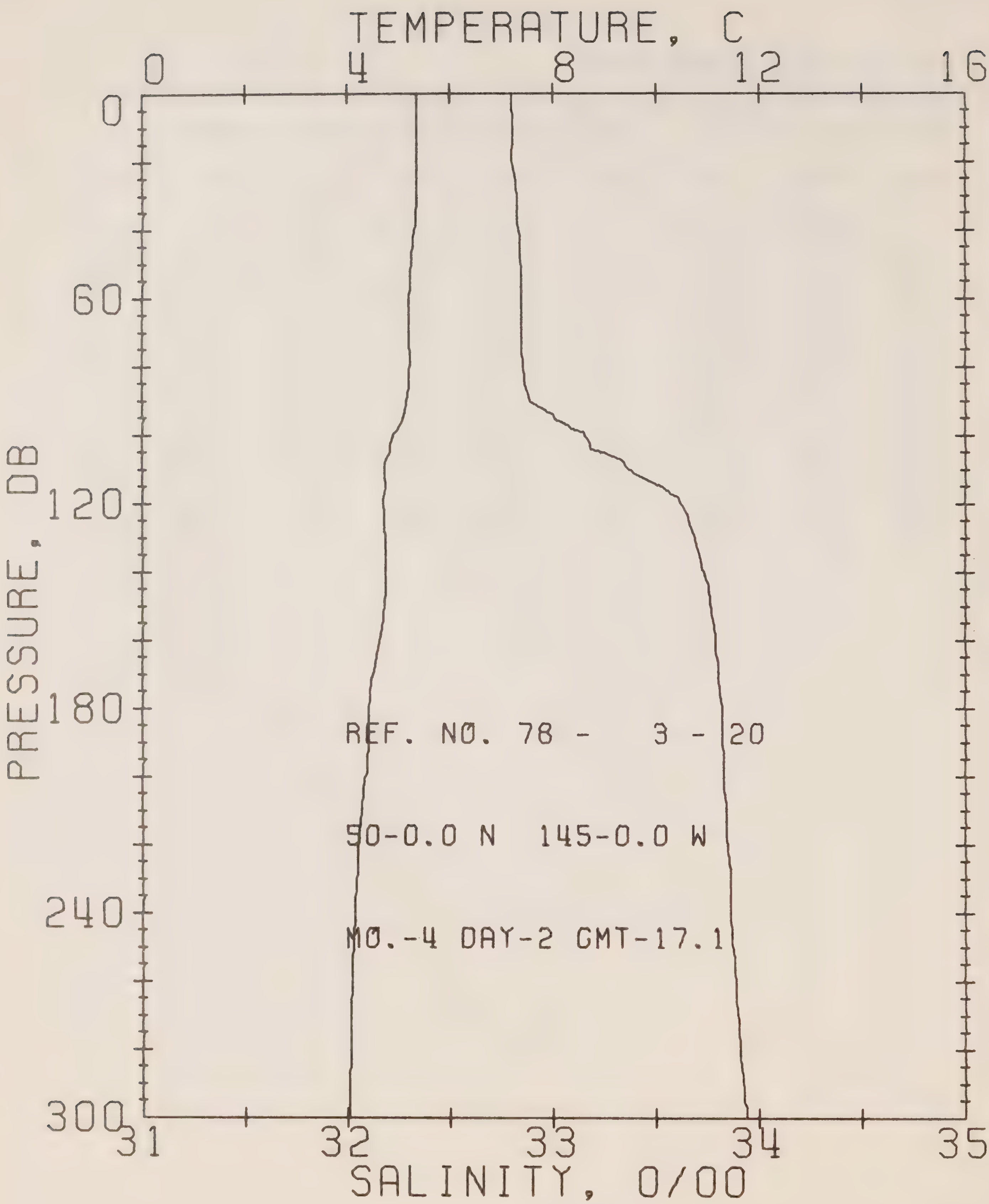
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 12 DATE 31/ 3/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.1
RESULTS OF STP CAST 149 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.39	32.83	0	25.94	207.6	0.0	0.0	1470.
10	5.39	32.83	10	25.94	207.9	0.21	0.01	1470.
20	5.39	32.84	20	25.95	206.9	0.42	0.04	1470.
30	5.39	32.85	30	25.95	206.5	0.62	0.09	1470.
50	5.39	32.85	50	25.95	206.7	1.04	0.26	1471.
75	5.28	32.87	75	25.99	204.0	1.55	0.59	1471.
100	5.20	32.96	99	26.07	196.6	2.05	1.04	1471.
125	4.74	33.56	124	26.59	147.2	2.48	1.53	1470.
150	4.71	33.80	149	26.78	129.3	2.82	2.00	1471.
175	4.48	33.85	174	26.85	123.1	3.13	2.52	1470.
200	4.26	33.87	199	26.89	119.2	3.44	3.10	1470.
225	4.14	33.89	223	26.92	117.0	3.73	3.74	1470.
250	4.10	33.92	248	26.94	114.4	4.02	4.44	1470.
300	4.09	34.00	298	27.01	108.9	4.58	6.00	1471.
400	3.89	34.10	397	27.11	99.8	5.62	9.71	1472.
500	3.73	34.18	496	27.19	93.1	6.59	14.13	1473.
600	3.54	34.24	595	27.25	87.6	7.49	19.17	1474.
800	3.19	34.35	793	27.37	77.0	9.12	30.80	1476.
1000	2.90	34.43	990	27.46	69.4	10.58	44.11	1478.
1200	2.68	34.49	1188	27.53	63.4	11.90	58.95	1480.
1500	2.37	34.56	1483	27.61	56.6	13.70	83.64	1484.


TEMPERATURE, C
0
4
8
12
16
PRESSURE, DB
0
60
120
180
240
300
REF. NO. 78 - 3 - 14
50-0.0 N 145-0.0 W
MO.-4 DAY-1 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

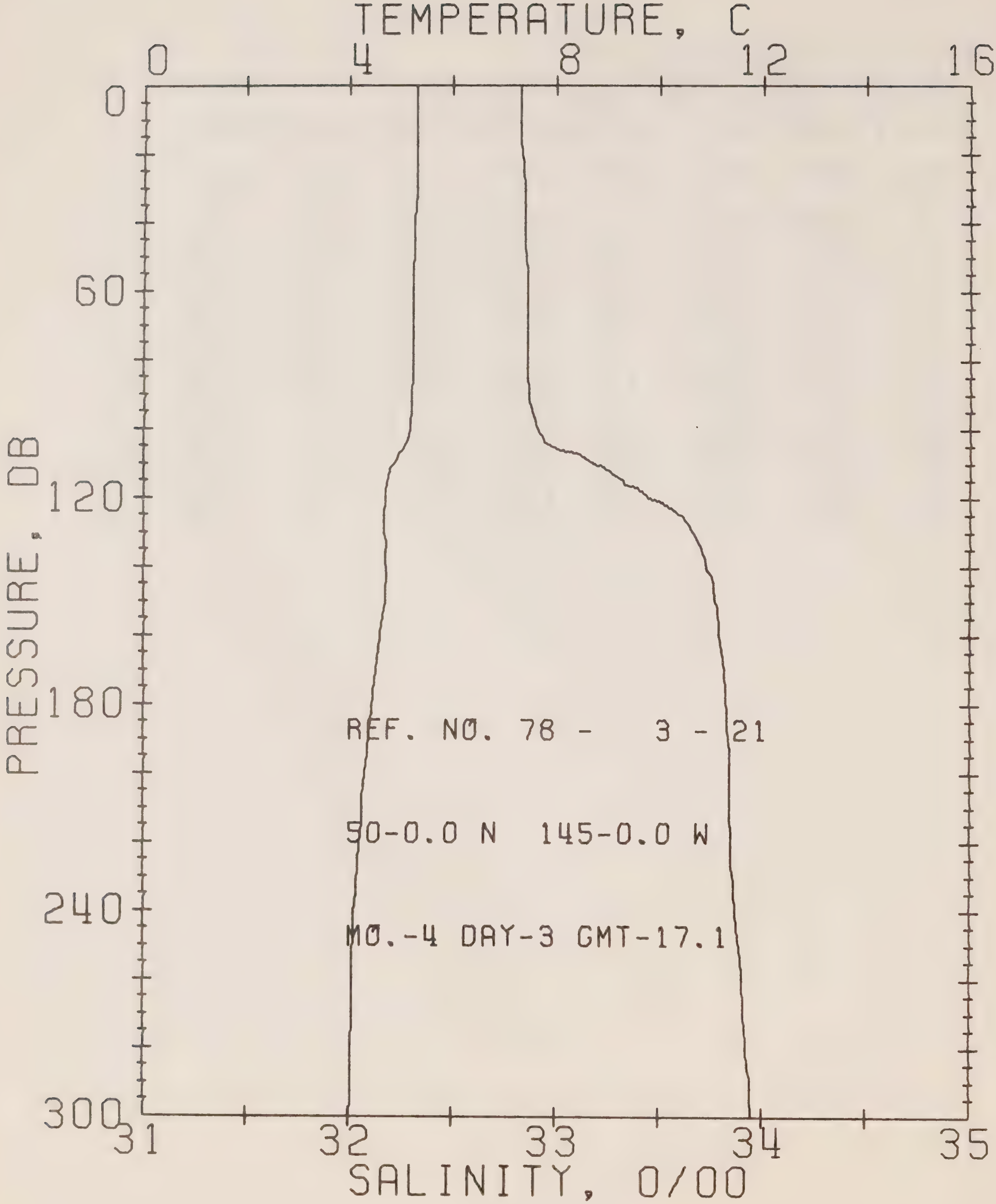
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 14 DATE 1/ 4/78 STATION P
POSITION 50- 0.0N. 145- 0.0W GMT 17.2
RESULTS OF STP CAST 85 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.39	32.86	0	25.96	205.3	0.0	0.0	1470.
10	5.39	32.86	10	25.96	205.6	0.21	0.01	1470.
20	5.35	32.87	20	25.97	204.7	0.41	0.04	1470.
30	5.26	32.87	30	25.99	203.5	0.61	0.09	1470.
50	5.23	32.88	50	26.00	202.7	1.02	0.26	1470.
75	5.23	32.90	75	26.01	201.7	1.53	0.58	1470.
100	4.92	33.30	99	26.37	168.0	2.00	1.00	1470.
125	4.72	33.75	124	26.74	132.7	2.38	1.43	1470.
150	4.60	33.84	149	26.82	125.2	2.70	1.88	1470.
175	4.41	33.86	174	26.86	121.6	3.00	2.39	1470.
200	4.28	33.88	199	26.89	119.0	3.30	2.96	1470.
225	4.15	33.89	223	26.92	116.8	3.60	3.60	1470.
250	4.05	33.93	248	26.95	113.6	3.89	4.30	1470.
300	4.02	33.98	298	27.00	109.7	4.44	5.86	1470.


TEMPERATURE, C
0
4
8
12
16
0
60
120
180
240
300
PRESSURE, DB
REF. NO. 78 - 3 - 20
50-0.0 N 145-0.0 W
MO.-4 DAY-2 GMT-17.1
31
32
33
34
35
SALINITY, O/OO

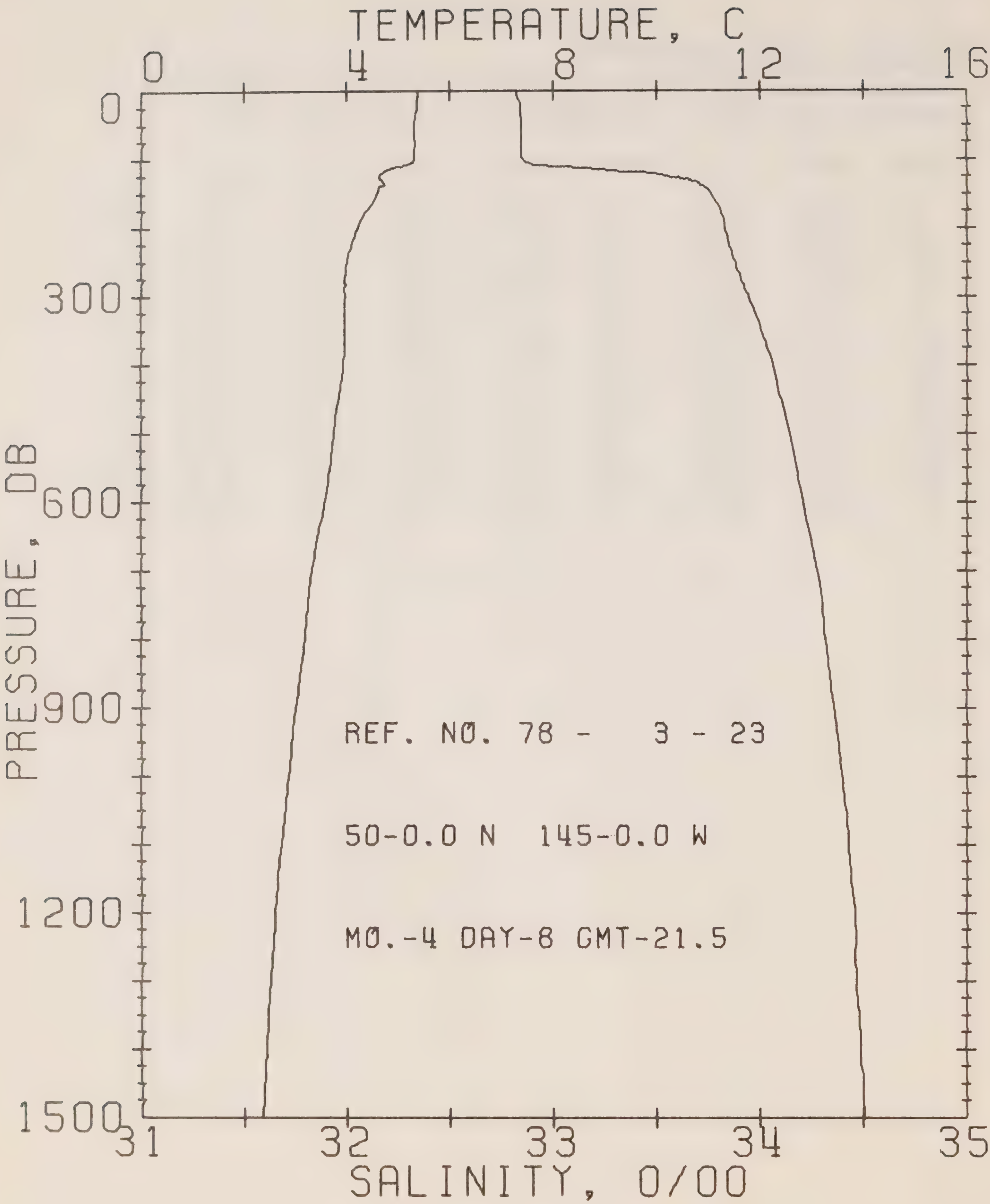
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 20 DATE 2/ 4/78 STATION P
POSITION 50- 0.0N. 145- 0.0W GMT 17.1
RESULTS OF STP CAST 92 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.37	32.80	0	25.92	209.5	0.0	0.0	1470.
10	5.37	32.81	10	25.92	209.2	0.21	0.01	1470.
20	5.36	32.80	20	25.92	209.9	0.42	0.04	1470.
30	5.35	32.83	30	25.94	207.9	0.63	0.10	1470.
50	5.23	32.84	50	25.97	205.4	1.04	0.26	1470.
75	5.22	32.85	75	25.97	205.1	1.55	0.59	1470.
100	4.89	33.15	99	26.25	179.4	2.05	1.03	1470.
125	4.73	33.66	124	26.67	139.8	2.44	1.48	1470.
150	4.72	33.76	149	26.75	131.9	2.78	1.95	1471.
175	4.44	33.81	174	26.82	125.9	3.10	2.49	1470.
200	4.33	33.83	199	26.85	123.3	3.41	3.08	1470.
225	4.18	33.85	223	26.88	120.1	3.72	3.74	1470.
250	4.10	33.87	248	26.90	118.1	4.02	4.46	1470.
300	4.03	33.94	298	26.97	112.7	4.59	6.08	1470.


TEMPERATURE, C
0
4
8
12
16
PRESSURE, DB
0
60
120
180
240
300
REF. NO. 78 - 3 - 21
50-0.0 N 145-0.0 W
MO.-4 DAY-3 GMT-17.1
31
32
33
34
35
SALINITY, 0/00

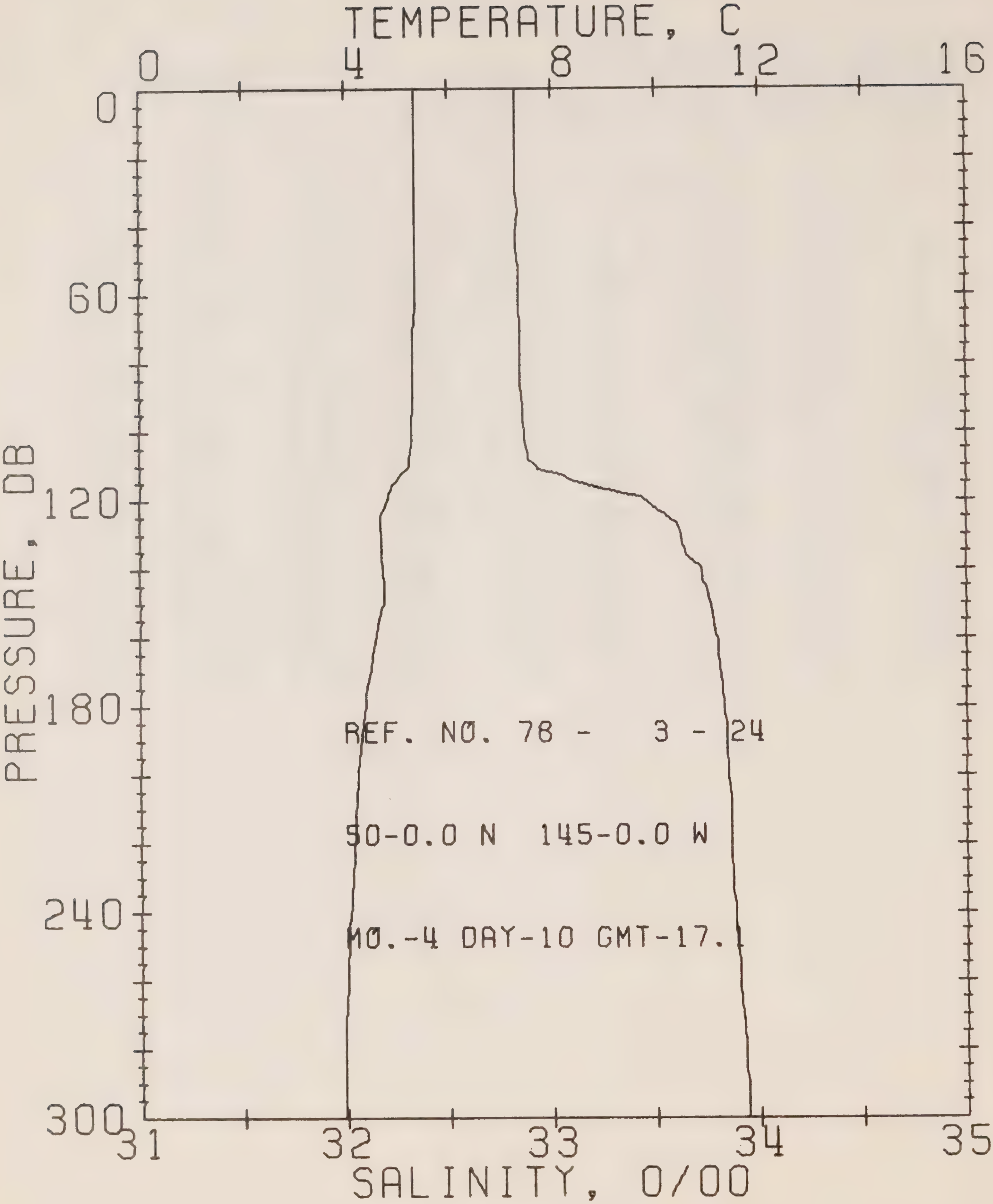
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 21 DATE 3/ 4/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.1
RESULTS OF STP CAST 81 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.32	32.83	0	25.95	206.8	0.0	0.0	1469.
10	5.31	32.83	10	25.95	207.0	0.21	0.01	1470.
20	5.31	32.83	20	25.95	206.8	0.41	0.04	1470.
30	5.30	32.85	30	25.96	205.7	0.62	0.09	1470.
50	5.24	32.85	50	25.97	204.8	1.03	0.26	1470.
75	5.22	32.86	75	25.98	204.4	1.54	0.59	1470.
100	5.17	32.91	99	26.03	200.3	2.05	1.04	1471.
125	4.66	33.61	124	26.64	142.6	2.48	1.53	1470.
150	4.68	33.77	149	26.76	131.0	2.82	2.01	1470.
175	4.47	33.82	174	26.82	125.3	3.14	2.53	1470.
200	4.29	33.84	199	26.86	122.1	3.45	3.12	1470.
225	4.17	33.85	223	26.88	120.4	3.75	3.78	1470.
250	4.06	33.88	248	26.92	116.8	4.05	4.50	1470.
300	4.01	33.95	298	26.98	111.8	4.62	6.10	1470.


TEMPERATURE, C
0
4
8
12
16
PRESSURE, DB
0
300
600
900
1200
1500
REF. NØ. 78 - 3 - 23
50-0.0 N 145-0.0 W
MØ.-4 DAY-8 GMT-21.5
31
32
33
34
35
SALINITY, 0/00

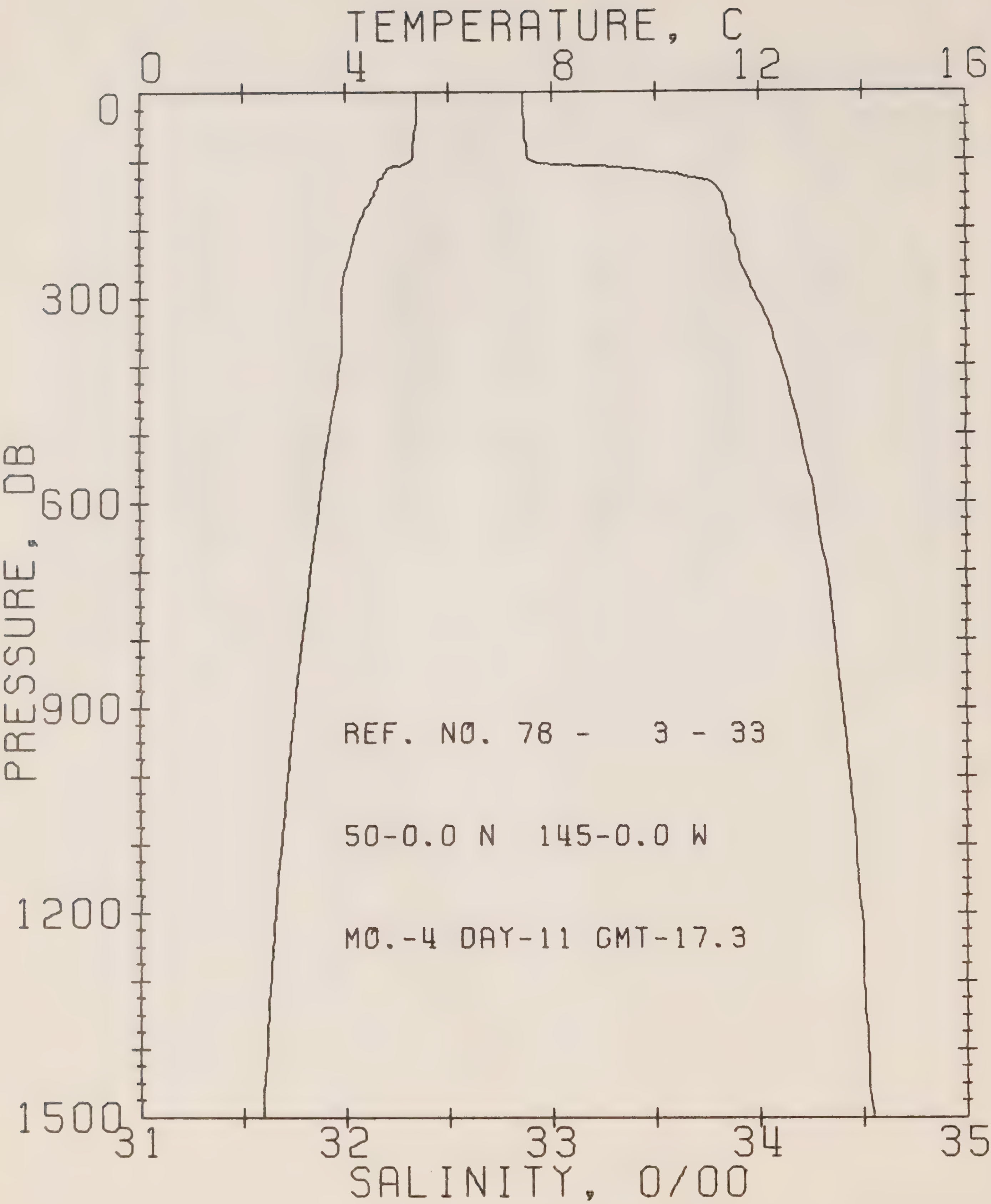
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 23 DATE 8/ 4/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 21.5
RESULTS OF STP CAST 156 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.39	32.83	0	25.94	207.6	0.0	0.0	1470.
10	5.37	32.83	10	25.94	207.9	0.21	0.01	1470.
20	5.36	32.84	20	25.95	206.9	0.42	0.04	1470.
30	5.34	32.84	30	25.95	206.8	0.62	0.10	1470.
50	5.32	32.85	50	25.96	206.0	1.04	0.26	1470.
75	5.33	32.85	75	25.96	206.3	1.55	0.59	1471.
100	5.30	32.86	99	25.97	205.8	2.07	1.05	1471.
125	4.63	33.57	124	26.61	145.3	2.52	1.56	1470.
150	4.59	33.75	149	26.76	131.3	2.86	2.04	1470.
175	4.36	33.81	174	26.83	125.1	3.18	2.57	1470.
200	4.20	33.83	199	26.86	121.9	3.49	3.16	1469.
225	4.09	33.85	223	26.89	119.5	3.79	3.81	1469.
250	3.98	33.87	248	26.92	116.8	4.08	4.53	1469.
300	3.97	33.94	298	26.97	112.2	4.65	6.13	1470.
400	3.93	34.06	397	27.07	103.7	5.73	9.96	1472.
500	3.73	34.14	496	27.15	96.4	6.73	14.55	1473.
600	3.55	34.20	595	27.22	90.3	7.67	19.78	1474.
800	3.16	34.31	793	27.35	79.5	9.35	31.73	1475.
1000	2.85	34.40	990	27.44	71.4	10.85	45.53	1478.
1200	2.60	34.46	1188	27.51	65.0	12.22	60.78	1480.
1500	2.35	34.51	1483	27.58	60.0	14.10	86.65	1484.


TEMPERATURE, C
0
4
8
12
16
0
60
120
180
240
300
PRESSURE, DB
REF. NO. 78 - 3 - 24
50-0.0 N 145-0.0 W
MO.-4 DAY-10 GMT-17.1
31
32
33
34
35
SALINITY, O/OO

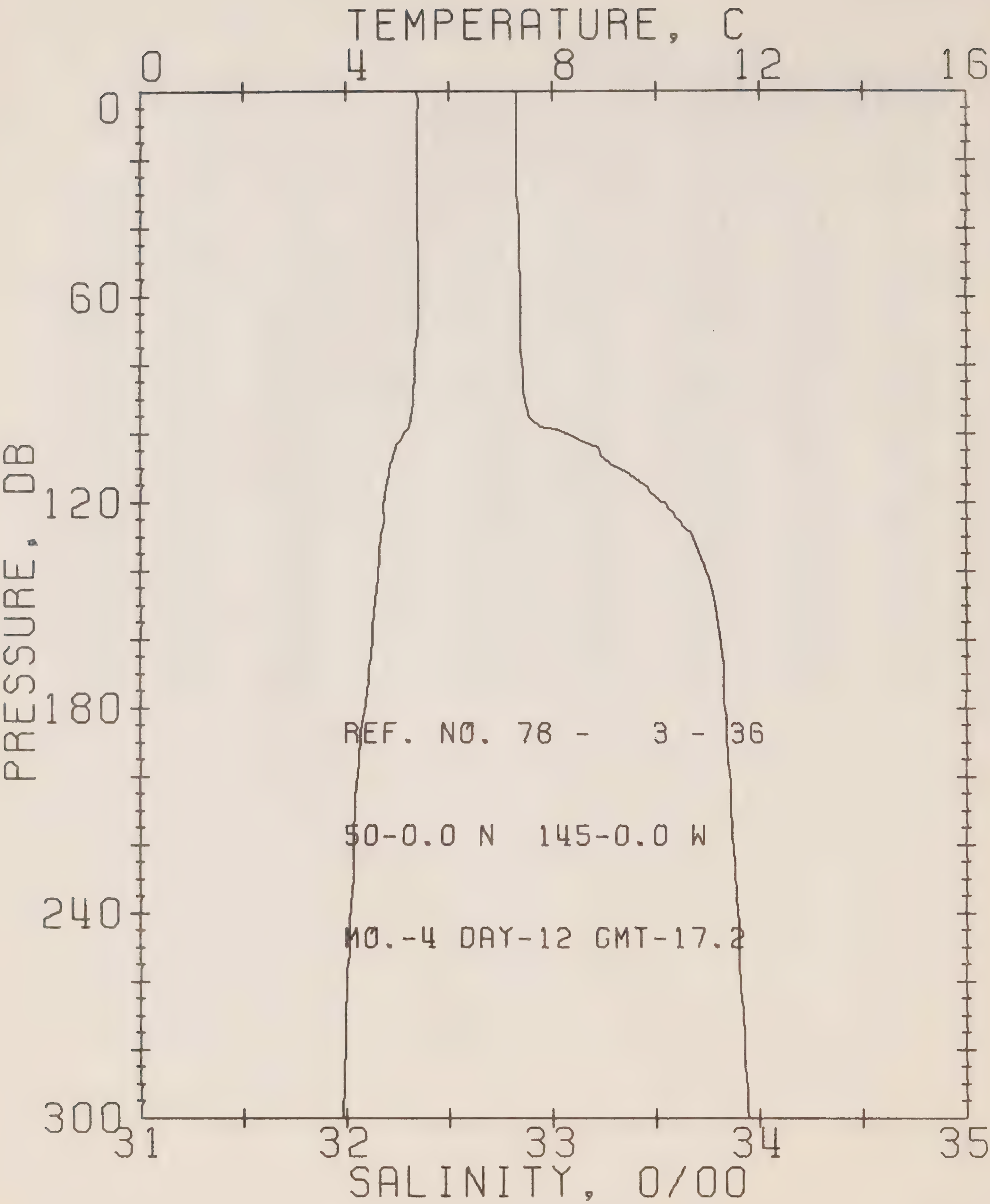
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 24 DATE 10/ 4/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.1
RESULTS OF STP CAST 95 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.37	32.83	0	25.94	207.4	0.0	0.0	1470.
10	5.36	32.83	10	25.94	207.5	0.21	0.01	1470.
20	5.36	32.83	20	25.94	207.6	0.42	0.04	1470.
30	5.37	32.83	30	25.94	207.9	0.62	0.10	1470.
50	5.36	32.84	50	25.95	207.5	1.04	0.26	1470.
75	5.32	32.85	75	25.96	206.2	1.56	0.59	1471.
100	5.28	32.87	99	25.98	204.8	2.07	1.05	1471.
125	4.67	33.56	124	26.60	146.4	2.53	1.57	1470.
150	4.75	33.76	149	26.75	132.6	2.87	2.06	1471.
175	4.39	33.82	174	26.83	124.5	3.19	2.59	1470.
200	4.21	33.85	199	26.87	120.6	3.50	3.17	1469.
225	4.12	33.86	223	26.90	118.8	3.80	3.82	1469.
250	4.03	33.89	248	26.93	116.1	4.09	4.53	1470.
300	3.95	33.94	298	26.97	112.0	4.66	6.12	1470.


TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 3 - 33
50-0.0 N 145-0.0 W
MO.-4 DAY-11 GMT-17.3
31
32
33
34
35
SALINITY, 0/00

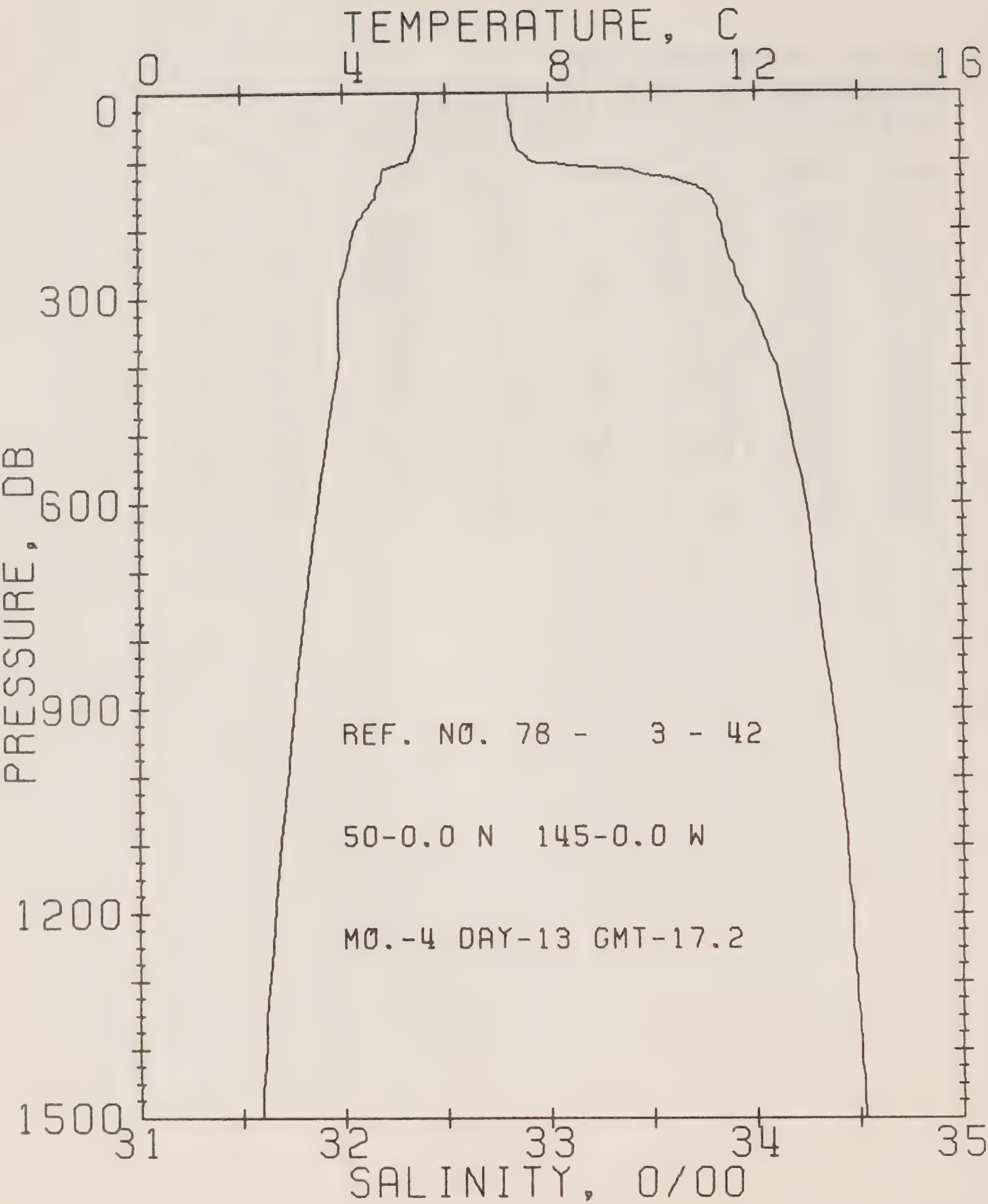
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 33 DATE 11/ 4/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.3
RESULTS OF STP CAST 144 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.40	32.86	0	25.96	205.4	0.0	0.0	1470.
10	5.40	32.86	10	25.96	205.7	0.21	0.01	1470.
20	5.39	32.86	20	25.96	205.7	0.41	0.04	1470.
30	5.39	32.86	30	25.96	205.8	0.62	0.09	1470.
50	5.37	32.87	50	25.97	205.1	1.03	0.26	1471.
75	5.32	32.87	75	25.98	204.5	1.54	0.59	1471.
100	5.26	32.90	99	26.01	202.1	2.05	1.04	1471.
125	4.70	33.67	124	26.68	138.5	2.47	1.52	1470.
150	4.58	33.82	149	26.81	126.2	2.80	1.98	1470.
175	4.35	33.85	174	26.86	121.9	3.11	2.49	1470.
200	4.21	33.86	199	26.88	119.7	3.41	3.07	1469.
225	4.11	33.89	223	26.92	116.7	3.70	3.71	1469.
250	4.03	33.91	248	26.94	114.6	3.99	4.40	1470.
300	3.92	33.98	298	27.01	108.6	4.55	5.96	1470.
400	3.88	34.11	397	27.12	99.2	5.58	9.64	1472.
500	3.66	34.20	496	27.21	91.2	6.53	14.00	1472.
600	3.48	34.27	595	27.28	84.9	7.41	18.93	1473.
800	3.14	34.36	793	27.39	75.7	9.01	30.30	1475.
1000	2.85	34.44	990	27.47	68.4	10.45	43.48	1478.
1200	2.62	34.49	1188	27.54	63.0	11.76	58.16	1480.
1500	2.36	34.55	1483	27.61	57.3	13.58	83.06	1484.


TEMPERATURE, C
0
4
8
12
16
0
60
120
180
240
300
PRESSURE, DB
REF. NO. 78 - 3 - 36
50-0.0 N 145-0.0 W
MO.-4 DAY-12 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

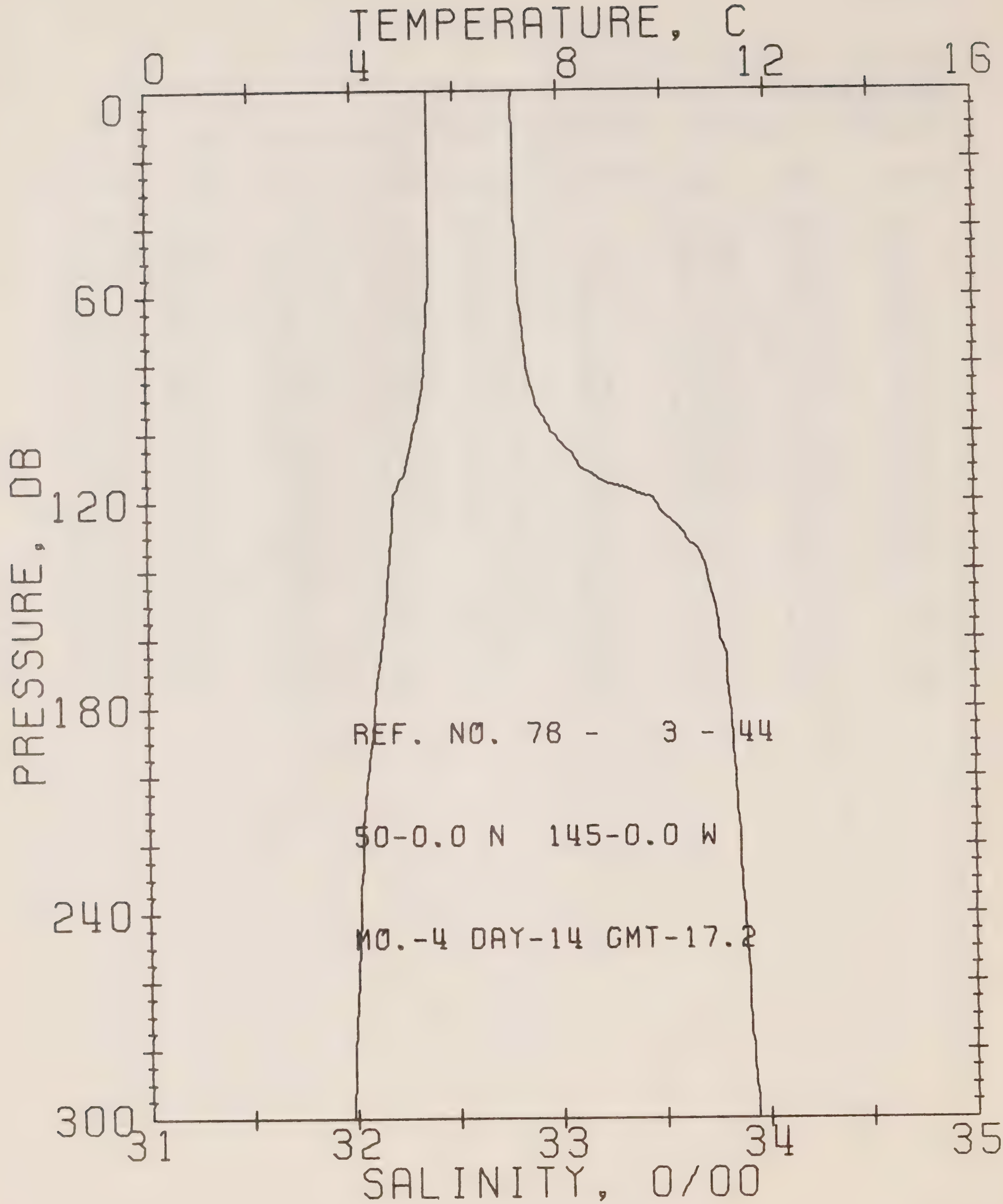
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 36 DATE 12/ 4/78 STATION P
POSITION 50- 0.0N. 145- 0.0W GMT 17.2
RESULTS OF STP CAST 79 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.40	32.83	0	25.94	207.6	0.0	0.0	1470.
10	5.39	32.83	10	25.94	207.9	0.21	0.01	1470.
20	5.40	32.83	20	25.94	208.1	0.42	0.04	1470.
30	5.40	32.83	30	25.94	208.2	0.62	0.10	1470.
50	5.41	32.84	50	25.94	207.7	1.04	0.26	1471.
75	5.35	32.85	75	25.96	206.6	1.56	0.59	1471.
100	5.12	33.07	99	26.16	187.8	2.07	1.05	1471.
125	4.74	33.61	124	26.63	143.4	2.47	1.51	1470.
150	4.55	33.78	149	26.79	128.5	2.81	1.98	1470.
175	4.39	33.83	174	26.84	123.7	3.12	2.50	1470.
200	4.20	33.86	199	26.88	119.9	3.43	3.08	1469.
225	4.13	33.88	223	26.91	117.7	3.72	3.73	1470.
250	4.04	33.90	248	26.93	115.5	4.02	4.43	1470.
300	3.93	33.95	298	26.98	111.0	4.58	6.02	1470.


TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 3 - 42
50-0.0 N 145-0.0 W
MO.-4 DAY-13 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

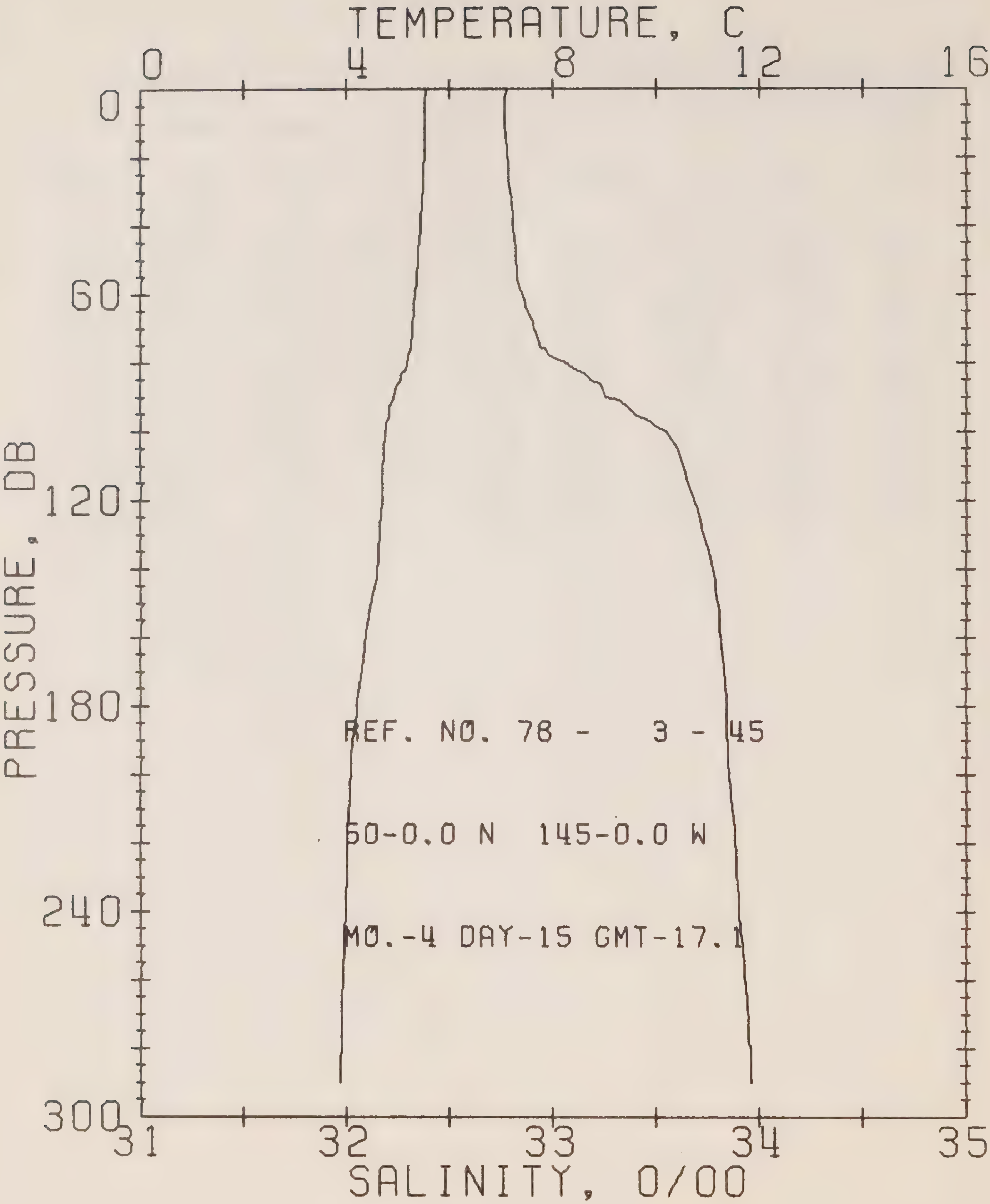
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 42 DATE 13/ 4/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.2
RESULTS OF STP CAST 150 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.47	32.80	0	25.90	210.7	0.0	0.0	1470.
10	5.48	32.80	10	25.90	211.1	0.21	0.01	1470.
20	5.46	32.80	20	25.91	211.0	0.42	0.04	1470.
30	5.45	32.81	30	25.91	210.2	0.63	0.10	1470.
50	5.44	32.82	50	25.92	209.5	1.05	0.27	1471.
75	5.40	32.84	75	25.94	208.1	1.58	0.60	1471.
100	5.24	32.92	99	26.03	200.3	2.09	1.06	1471.
125	4.75	33.59	124	26.61	145.0	2.51	1.54	1470.
150	4.63	33.78	149	26.77	129.7	2.85	2.01	1470.
175	4.39	33.82	174	26.83	124.5	3.16	2.54	1470.
200	4.21	33.84	199	26.87	121.3	3.47	3.12	1469.
225	4.12	33.86	223	26.89	119.1	3.77	3.77	1469.
250	4.05	33.89	248	26.92	116.2	4.07	4.49	1470.
300	3.90	33.95	298	26.99	110.7	4.63	6.07	1470.
400	3.89	34.10	397	27.11	100.0	5.68	9.81	1472.
500	3.67	34.17	496	27.19	93.0	6.65	14.23	1473.
600	3.48	34.24	595	27.26	86.9	7.55	19.26	1473.
800	3.14	34.32	793	27.36	78.4	9.20	31.01	1475.
1000	2.88	34.41	990	27.45	71.0	10.68	44.60	1478.
1200	2.62	34.47	1188	27.52	64.5	12.03	59.75	1480.
1500	2.36	34.53	1483	27.59	58.8	13.89	85.18	1484.


TEMPERATURE, C
0
4
8
12
16
0
60
120
180
240
300
PRESSURE, DB
REF. NO. 78 - 3 - 44
50-0.0 N 145-0.0 W
MO.-4 DAY-14 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

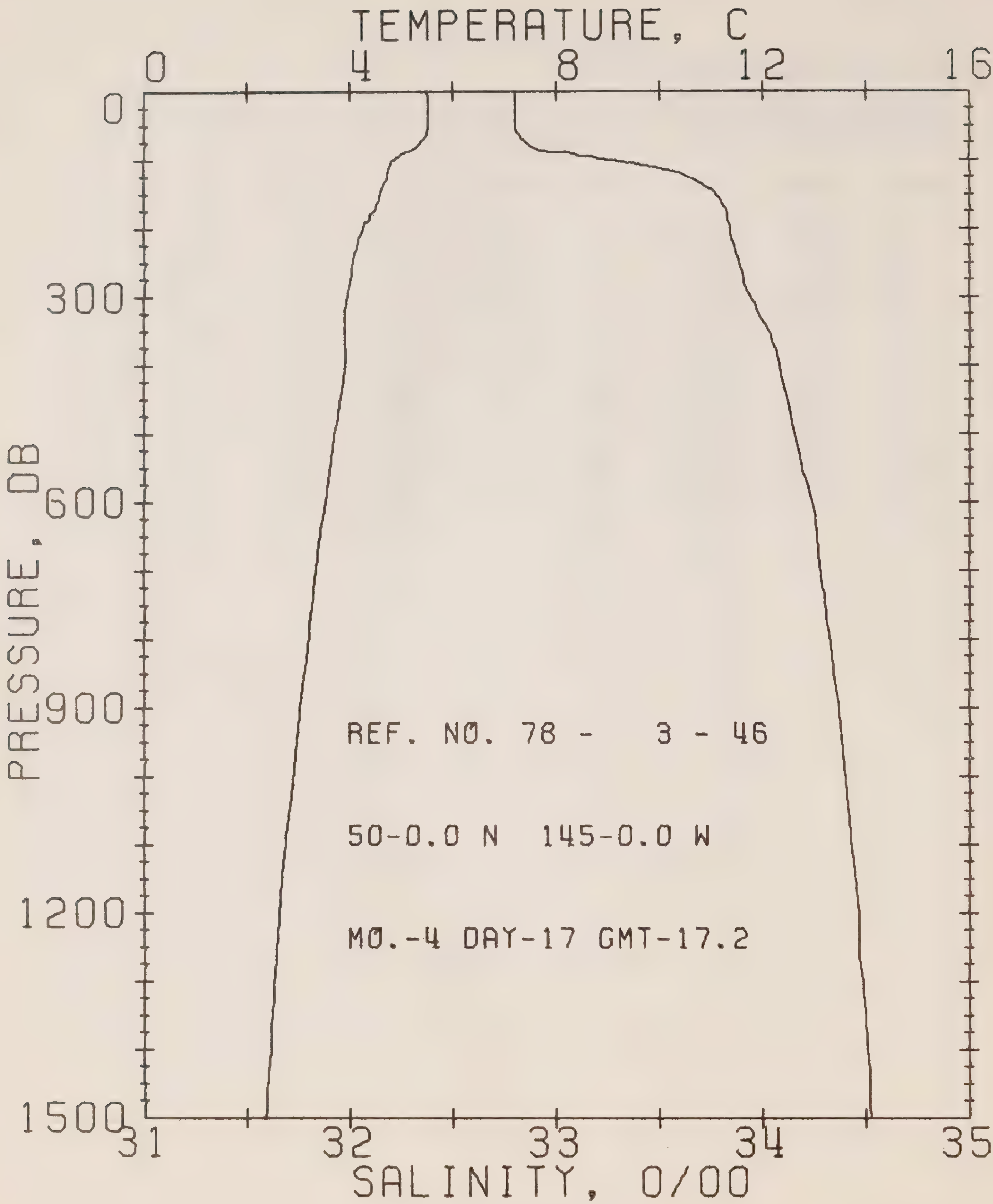
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 44 DATE 14/ 4/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.2
RESULTS OF STP CAST 83 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.49	32.79	0	25.89	211.6	0.0	0.0	1470.
10	5.50	32.79	10	25.89	212.3	0.21	0.01	1470.
20	5.50	32.79	20	25.89	212.1	0.42	0.04	1470.
30	5.49	32.79	30	25.89	212.2	0.64	0.10	1471.
50	5.48	32.80	50	25.90	211.5	1.06	0.27	1471.
75	5.41	32.83	75	25.94	208.4	1.59	0.60	1471.
100	5.16	32.97	99	26.07	195.7	2.10	1.06	1471.
125	4.74	33.52	124	26.56	149.8	2.53	1.56	1470.
150	4.62	33.74	149	26.75	132.5	2.88	2.04	1470.
175	4.41	33.81	174	26.82	125.6	3.20	2.57	1470.
200	4.23	33.84	199	26.87	121.5	3.51	3.16	1470.
225	4.12	33.86	223	26.89	119.1	3.81	3.81	1469.
250	4.05	33.89	248	26.92	116.2	4.10	4.52	1470.
300	3.92	33.94	298	26.98	111.7	4.67	6.12	1470.


TEMPERATURE, C
0
4
8
12
16
0
60
120
180
240
300
PRESSURE, DB
REF. NO. 78 - 3 - 45
50-0.0 N 145-0.0 W
MO.-4 DAY-15 GMT-17.1
31
32
33
34
35
SALINITY, 0/00

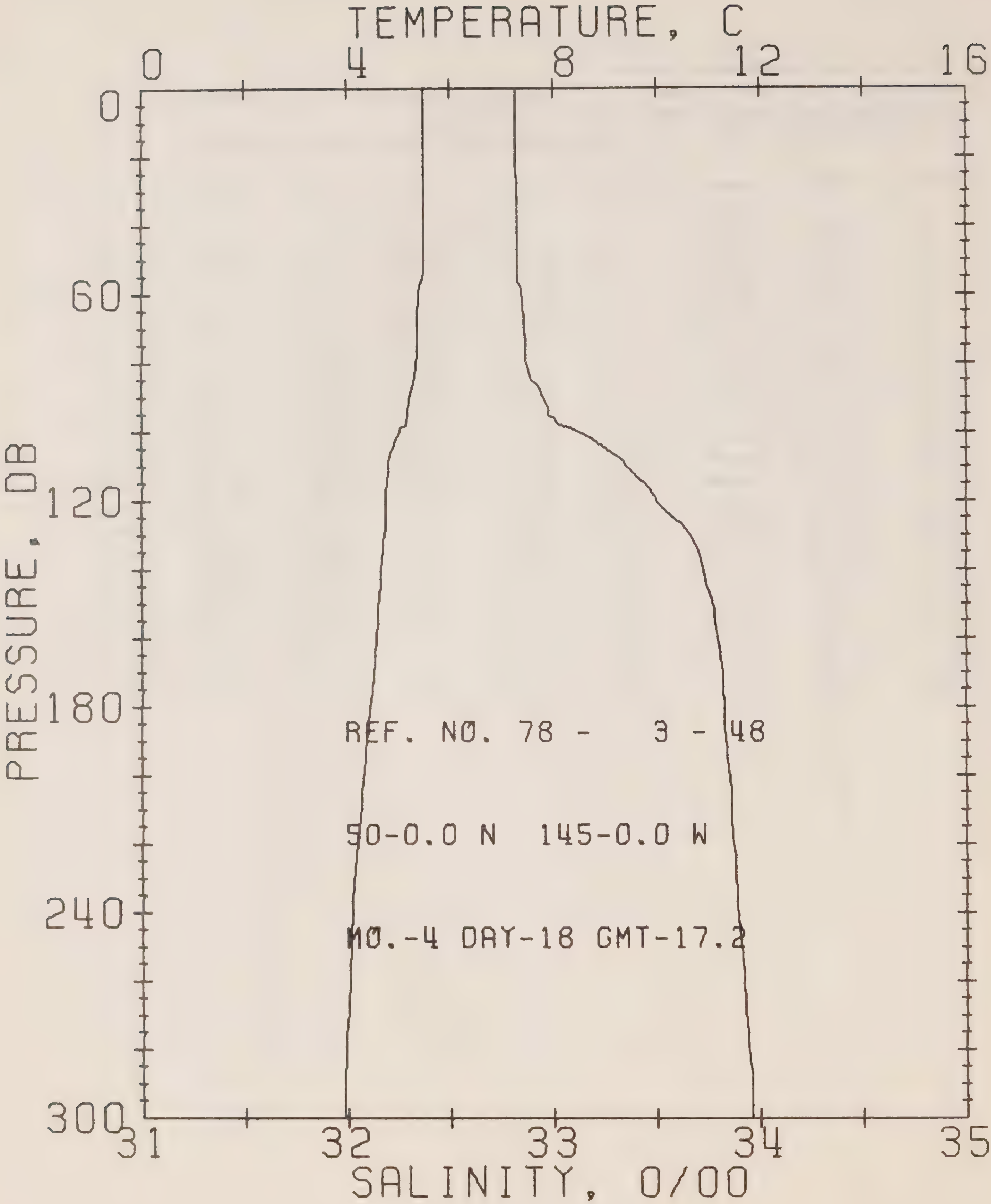
OFFSHCRE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 45 DATE 15/ 4/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.1
RESULTS OF STP CAST 85 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	PCT. EN	SOUND
0	5.54	32.78	0	25.88	213.0	0.0	0.0	1470.
10	5.51	32.77	10	25.88	213.7	0.21	0.01	1470.
20	5.51	32.78	20	25.89	212.8	0.43	0.04	1470.
30	5.47	32.79	30	25.90	211.6	0.64	0.10	1471.
50	5.39	32.82	50	25.93	208.8	1.06	0.27	1471.
75	5.24	32.94	75	26.04	198.6	1.57	0.59	1470.
100	4.75	33.55	99	26.58	147.8	2.01	0.98	1470.
125	4.66	33.71	124	26.71	135.3	2.36	1.38	1470.
150	4.47	33.80	149	26.81	126.6	2.68	1.84	1470.
175	4.24	33.84	174	26.86	121.6	2.99	2.35	1469.
200	4.07	33.85	199	26.89	118.8	3.29	2.93	1469.
225	4.00	33.89	223	26.93	115.7	3.59	3.56	1469.
250	3.95	33.92	248	26.96	113.2	3.87	4.25	1469.


TEMPERATURE, C
0
4
8
12
16
PRESSURE, DB
0
300
600
900
1200
1500
REF. NO. 78 - 3 - 46
50-0.0 N 145-0.0 W
MO.-4 DAY-17 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

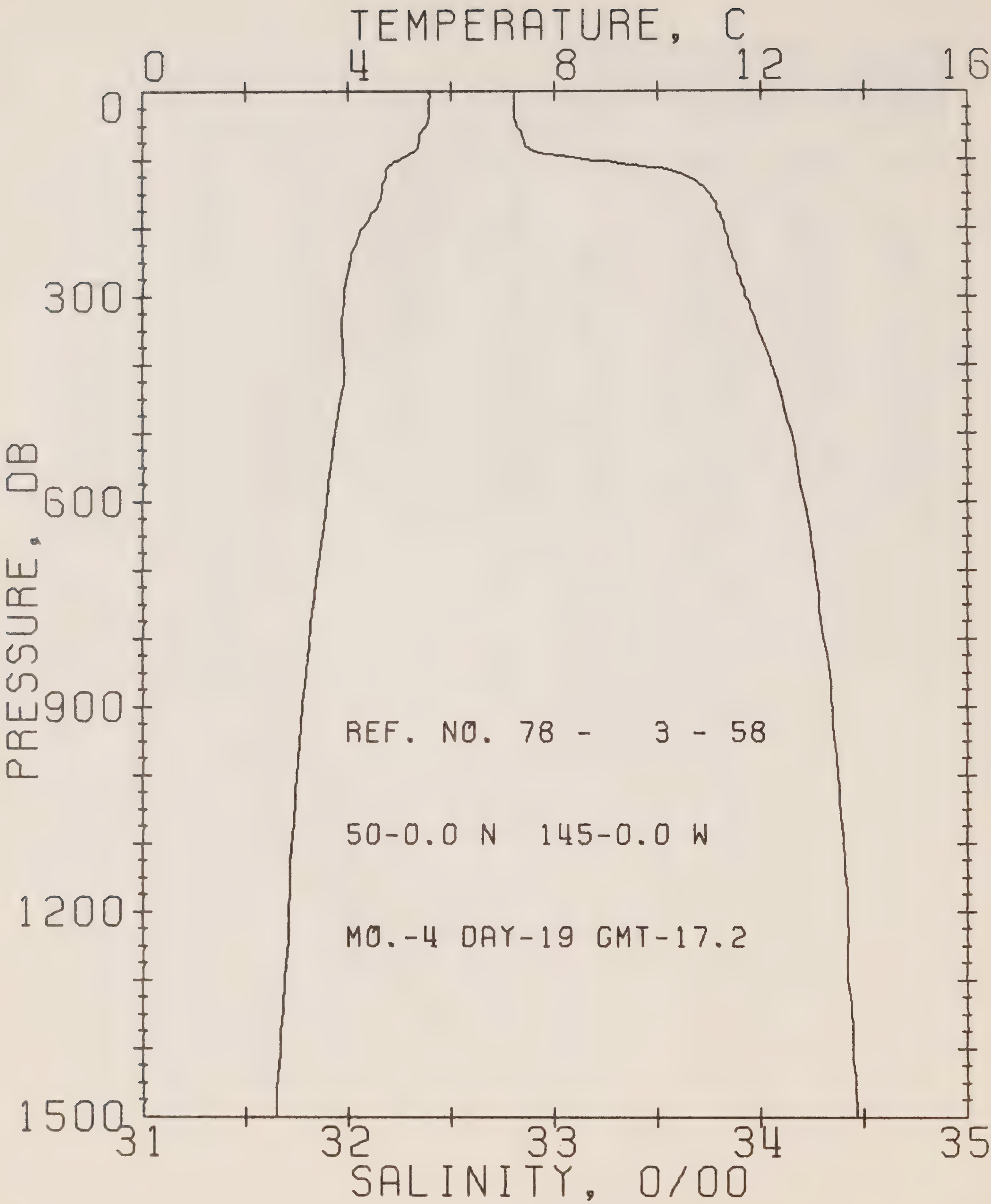
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 46 DATE 17/ 4/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.2
RESULTS OF STP CAST 142 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.50	32.80	0	25.90	211.0	0.0	0.0	1470.
10	5.51	32.80	10	25.90	211.4	0.21	0.01	1470.
20	5.51	32.80	20	25.90	211.5	0.42	0.04	1471.
30	5.51	32.80	30	25.90	211.6	0.63	0.10	1471.
50	5.51	32.80	50	25.90	211.8	1.06	0.27	1471.
75	5.36	32.86	75	25.96	206.0	1.58	0.60	1471.
100	4.85	33.27	99	26.35	169.9	2.06	1.03	1470.
125	4.71	33.64	124	26.65	141.0	2.45	1.47	1470.
150	4.58	33.77	149	26.77	130.1	2.78	1.94	1470.
175	4.45	33.82	174	26.83	124.8	3.10	2.47	1470.
200	4.24	33.84	199	26.86	121.6	3.41	3.05	1470.
225	4.13	33.86	223	26.89	119.2	3.71	3.71	1470.
250	4.04	33.88	248	26.92	116.7	4.01	4.42	1470.
300	3.94	33.94	298	26.97	111.9	4.58	6.03	1470.
400	3.89	34.08	397	27.09	101.8	5.64	9.80	1472.
500	3.70	34.15	496	27.17	95.1	6.62	14.32	1473.
600	3.51	34.23	595	27.25	87.7	7.54	19.44	1474.
800	3.18	34.32	793	27.35	79.0	9.20	31.27	1476.
1000	2.89	34.40	990	27.44	71.3	10.70	45.01	1478.
1200	2.62	34.47	1188	27.52	64.6	12.06	60.21	1480.
1500	2.35	34.53	1483	27.59	58.6	13.91	85.64	1484.


TEMPERATURE, C
0
4
8
12
16
PRESSURE, DB
0
60
120
180
240
300
REF. NO. 78 - 3 - 48
50-0.0 N 145-0.0 W
MO.-4 DAY-18 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

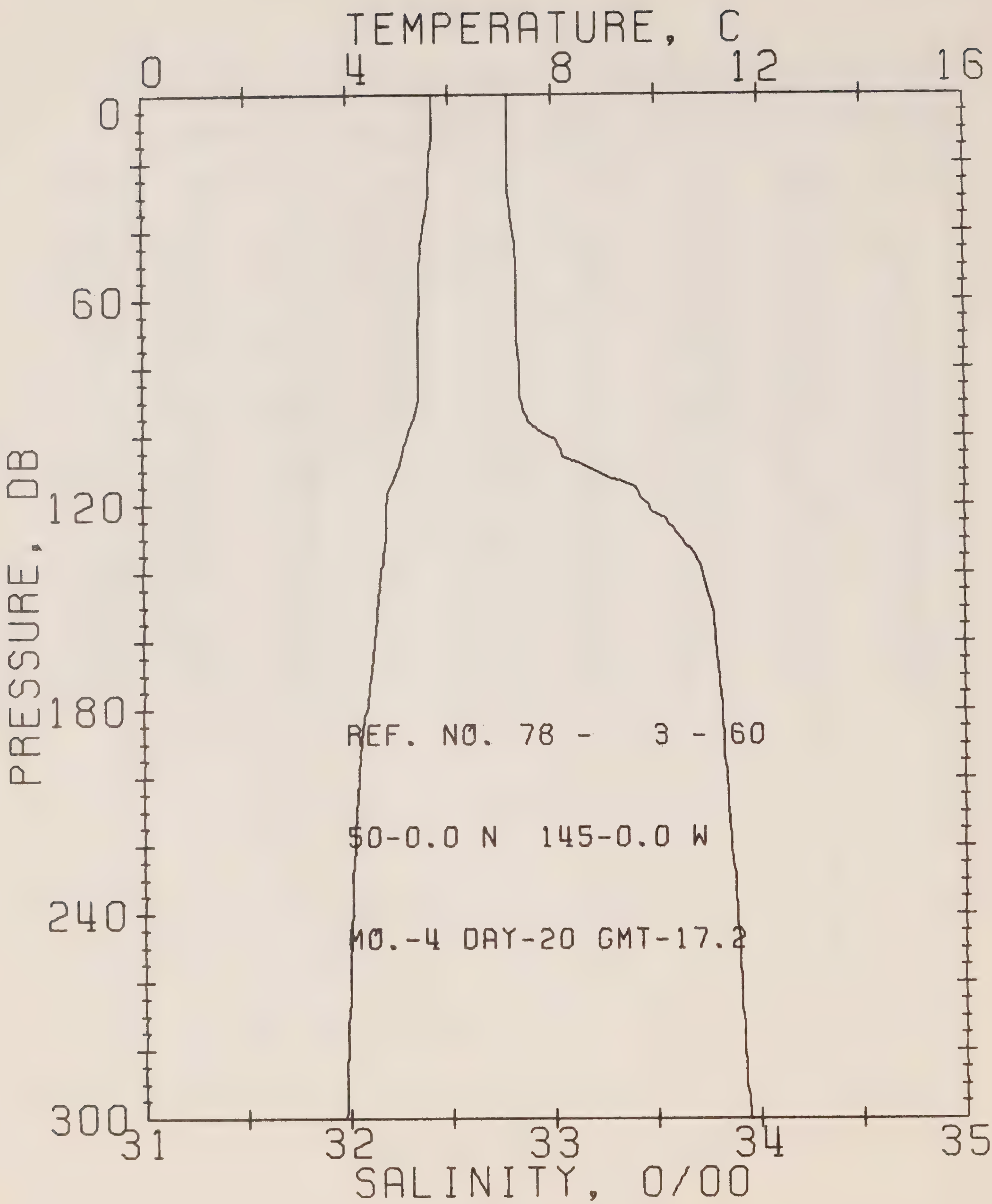
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 48 DATE 18/ 4/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.2
RESULTS OF STP CAST 79 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.49	32.82	0	25.92	209.4	0.0	0.0	1470.
10	5.50	32.82	10	25.92	209.9	0.21	0.01	1470.
20	5.50	32.82	20	25.92	210.0	0.42	0.04	1470.
30	5.50	32.83	30	25.92	209.3	0.63	0.10	1471.
50	5.49	32.83	50	25.93	209.4	1.05	0.27	1471.
75	5.35	32.87	75	25.97	205.3	1.57	0.60	1471.
100	5.00	33.12	99	26.21	182.5	2.06	1.04	1470.
125	4.74	33.58	124	26.60	145.7	2.47	1.50	1470.
150	4.61	33.77	149	26.77	130.5	2.81	1.97	1470.
175	4.47	33.82	174	26.82	125.3	3.12	2.50	1470.
200	4.31	33.85	199	26.86	121.6	3.43	3.09	1470.
225	4.14	33.88	223	26.91	117.9	3.73	3.74	1470.
250	4.05	33.91	248	26.94	114.7	4.02	4.44	1470.
300	3.91	33.96	298	26.99	110.0	4.58	6.01	1470.


TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 3 - 58
50-0.0 N 145-0.0 W
MO.-4 DAY-19 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

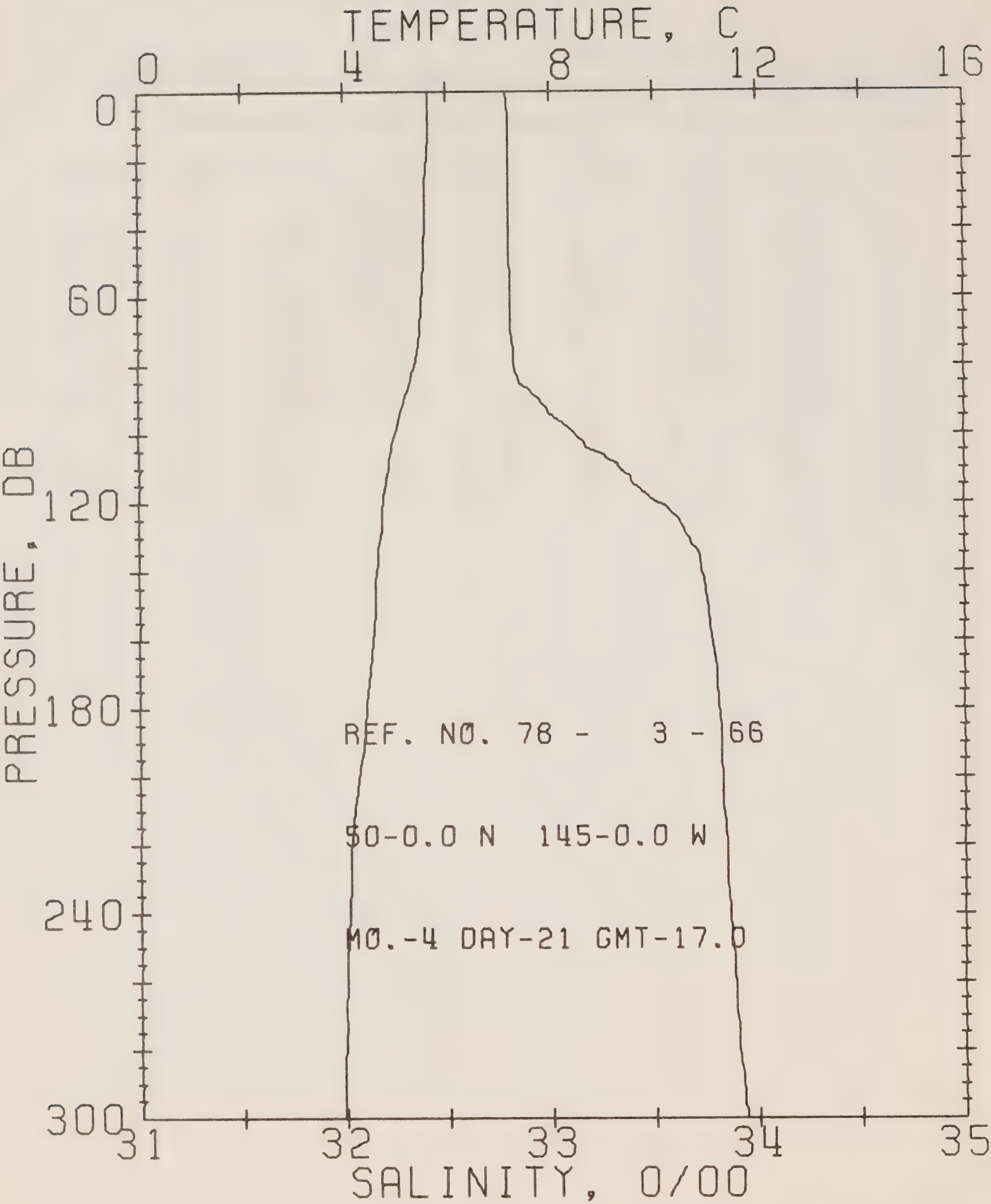
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 58 DATE 19/ 4/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.2
RESULTS OF STP CAST 166 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.54	32.81	0	25.90	210.7	0.0	0.0	1470.
10	5.58	32.81	10	25.90	211.5	0.21	0.01	1471.
20	5.57	32.81	20	25.90	211.5	0.42	0.04	1471.
30	5.56	32.81	30	25.90	211.4	0.63	0.10	1471.
50	5.52	32.82	50	25.91	210.5	1.06	0.27	1471.
75	5.37	32.86	75	25.96	206.4	1.58	0.60	1471.
100	5.00	33.14	99	26.23	181.2	2.07	1.04	1470.
125	4.73	33.64	124	26.66	140.8	2.46	1.49	1470.
150	4.64	33.74	149	26.75	132.4	2.80	1.96	1470.
175	4.49	33.79	174	26.80	127.8	3.13	2.50	1470.
200	4.29	33.82	199	26.84	123.6	3.44	3.10	1470.
225	4.14	33.84	223	26.87	120.7	3.75	3.76	1470.
250	4.02	33.87	248	26.91	117.4	4.04	4.48	1469.
300	3.91	33.92	298	26.96	113.0	4.62	6.09	1470.
400	3.92	34.05	397	27.06	104.2	5.70	9.94	1472.
500	3.73	34.15	496	27.16	95.9	6.70	14.52	1473.
600	3.56	34.21	595	27.22	90.3	7.63	19.73	1474.
800	3.23	34.30	793	27.33	81.0	9.34	31.88	1476.
1000	3.00	34.37	990	27.41	74.5	10.88	46.04	1478.
1200	2.84	34.42	1188	27.46	70.6	12.33	62.21	1481.
1500	2.58	34.47	1483	27.52	65.6	14.38	90.42	1485.


TEMPERATURE, C
0
4
8
12
16
0
60
120
180
240
300
PRESSURE, DB
31
32
33
34
35
SALINITY, 0/00
REF. NO. 78 - 3 - 60
50-0.0 N 145-0.0 W
MO.-4 DAY-20 GMT-17.2

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 60 DATE 20/ 4/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.2
RESULTS OF STP CAST 89 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.69	32.79	0	25.87	213.9	0.0	0.0	1471.
10	5.67	32.79	10	25.87	214.0	0.21	0.01	1471.
20	5.61	32.79	20	25.88	213.5	0.43	0.04	1471.
30	5.58	32.79	30	25.88	213.1	0.64	0.10	1471.
50	5.43	32.83	50	25.93	208.9	1.06	0.27	1471.
75	5.40	32.83	75	25.94	208.3	1.58	0.60	1471.
100	5.16	32.98	99	26.08	195.0	2.10	1.06	1471.
125	4.74	33.55	124	26.58	147.7	2.53	1.55	1470.
150	4.58	33.77	149	26.77	130.1	2.87	2.02	1470.
175	4.39	33.81	174	26.83	125.0	3.19	2.55	1470.
200	4.18	33.84	199	26.87	120.8	3.49	3.14	1469.
225	4.08	33.87	223	26.90	117.9	3.79	3.79	1469.
250	4.02	33.90	248	26.94	115.2	4.08	4.49	1470.
300	3.90	33.95	298	26.99	110.7	4.65	6.08	1470.


TEMPERATURE, C
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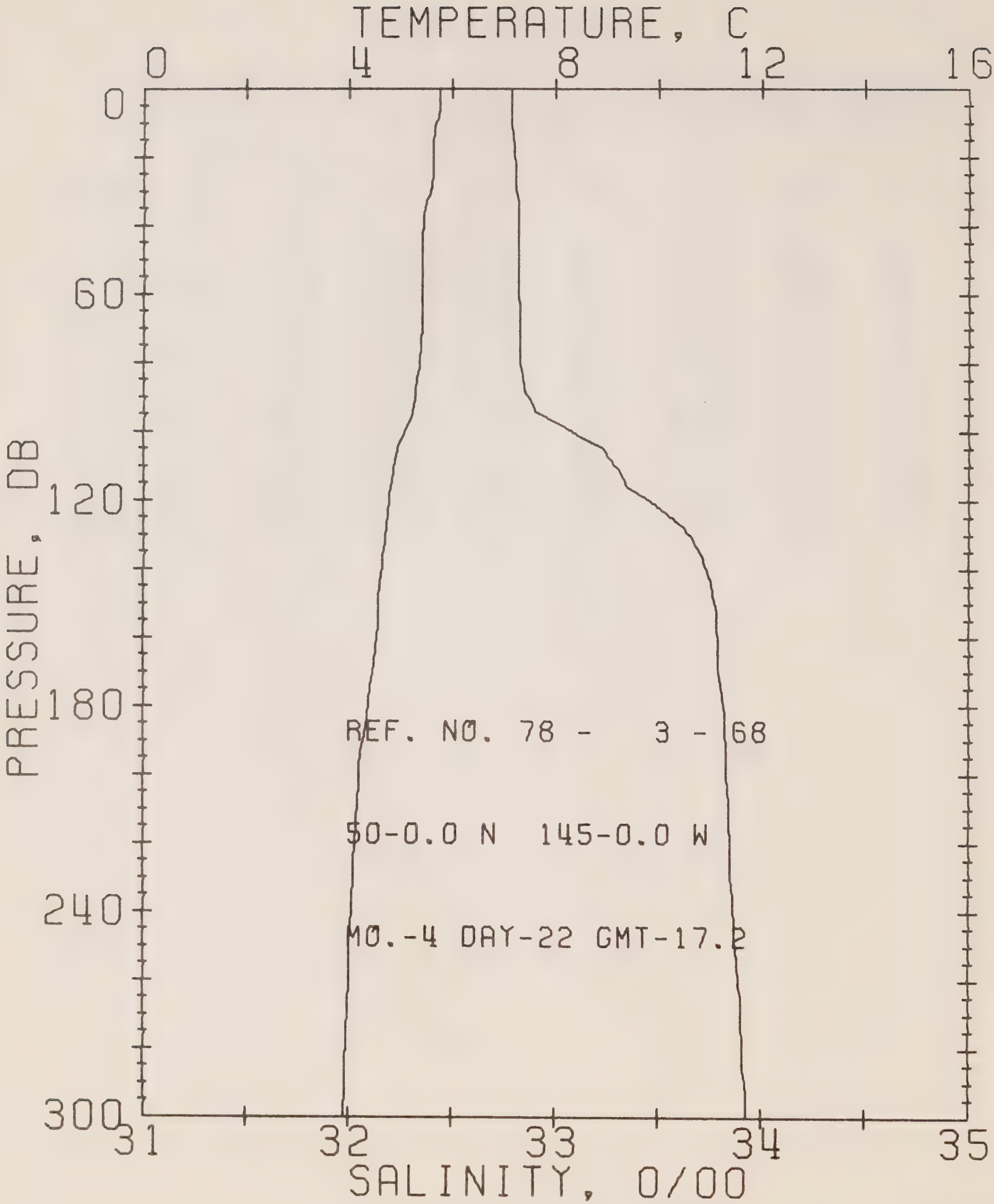
4
8
12
16
0
60
120
180
240
300
PRESSURE, DB
REF. NO. 78 - 3 - 66
50-0.0 N 145-0.0 W
MO.-4 DAY-21 GMT-17.0
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 66 DATE 21/ 4/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.0
RESULTS OF STP CAST 84 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.66	32.79	0	25.87	213.5	0.0	0.0	1471.
10	5.65	32.80	10	25.88	213.0	0.21	0.01	1471.
20	5.62	32.80	20	25.89	212.8	0.43	0.04	1471.
30	5.58	32.80	30	25.89	212.4	0.64	0.10	1471.
50	5.53	32.80	50	25.90	211.9	1.06	0.27	1471.
75	5.42	32.82	75	25.92	209.7	1.59	0.61	1471.
100	4.97	33.11	99	26.21	183.0	2.09	1.05	1470.
125	4.72	33.62	124	26.64	142.4	2.50	1.51	1470.
150	4.58	33.75	149	26.76	131.2	2.83	1.99	1470.
175	4.43	33.80	174	26.82	126.0	3.16	2.52	1470.
200	4.24	33.83	199	26.85	122.5	3.47	3.11	1470.
225	4.09	33.85	223	26.89	119.5	3.77	3.77	1469.
250	4.02	33.87	248	26.91	117.2	4.07	4.48	1469.
300	3.96	33.94	298	26.97	112.1	4.64	6.09	1470.


TEMPERATURE, C
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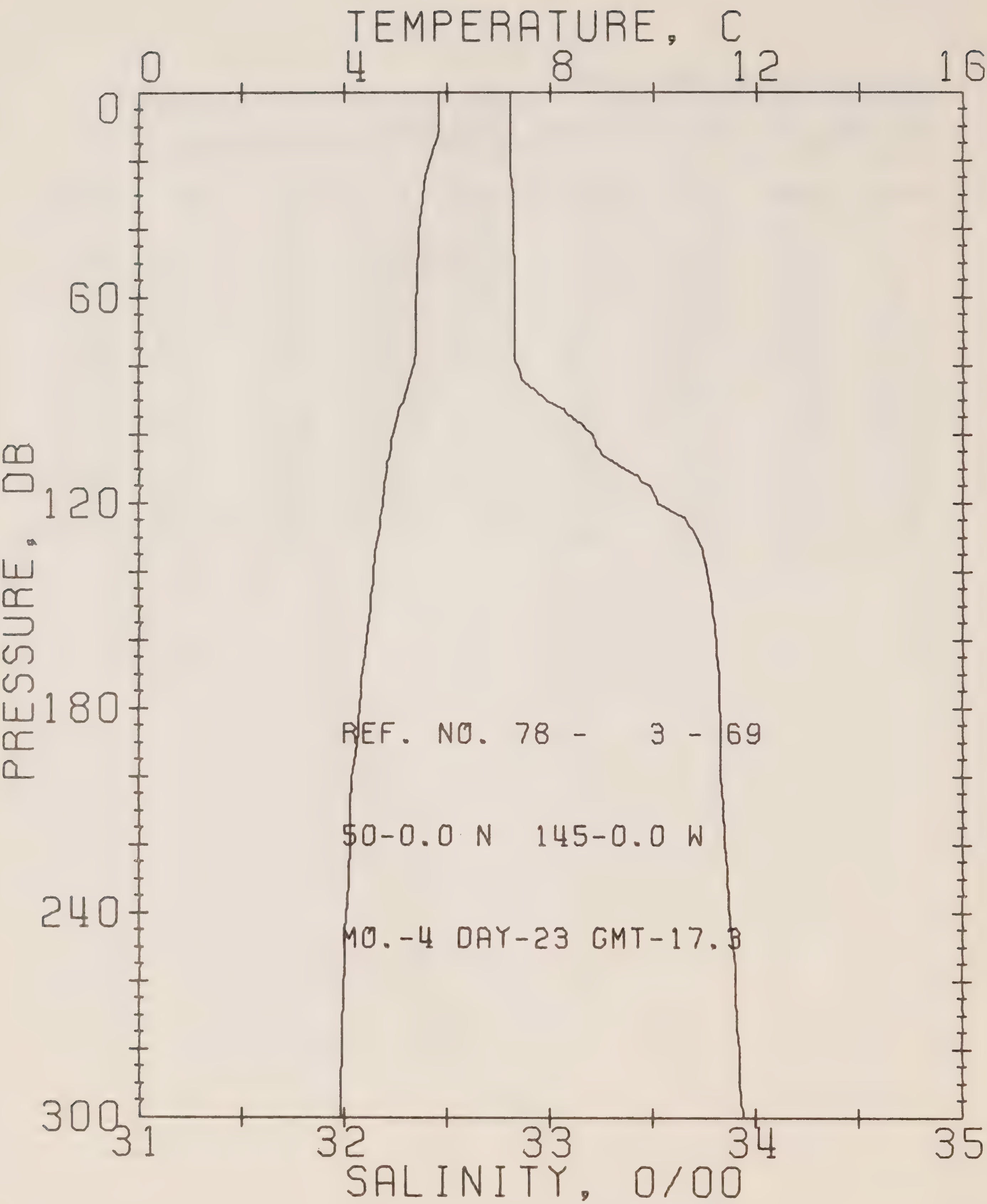
4
8
12
16
0
60
120
180
240
300
PRESSURE, DB
REF. NO. 78 - 3 - 68
50-0.0 N 145-0.0 W
MO.-4 DAY-22 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

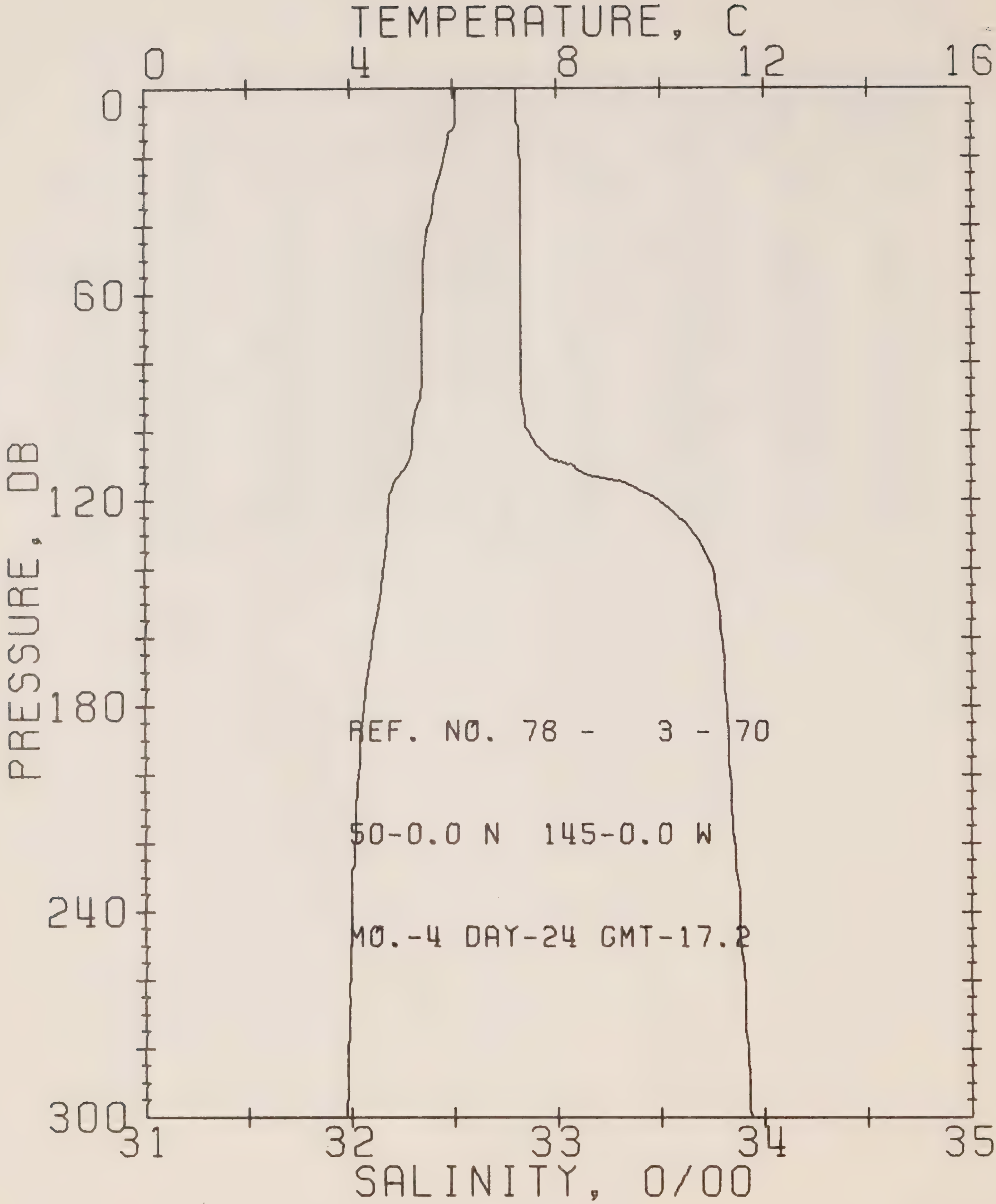
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 68 DATE 22/ 4/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.2
RESULTS OF STP CAST 86 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.75	32.79	0	25.86	214.6	0.0	0.0	1471.
10	5.68	32.79	10	25.87	214.1	0.21	0.01	1471.
20	5.63	32.80	20	25.89	212.7	0.43	0.04	1471.
30	5.57	32.81	30	25.90	211.6	0.64	0.10	1471.
50	5.41	32.82	50	25.93	209.3	1.06	0.27	1471.
75	5.39	32.83	75	25.94	208.5	1.58	0.60	1471.
100	5.07	33.08	99	26.17	186.5	2.09	1.05	1470.
125	4.73	33.56	124	26.59	147.1	2.50	1.53	1470.
150	4.57	33.77	149	26.77	130.0	2.84	2.00	1470.
175	4.39	33.80	174	26.82	125.7	3.16	2.53	1470.
200	4.19	33.83	199	26.86	121.8	3.47	3.12	1469.
225	4.09	33.85	223	26.89	119.4	3.77	3.77	1469.
250	4.01	33.87	248	26.91	117.2	4.07	4.49	1469.
300	3.90	33.93	298	26.97	112.2	4.64	6.09	1470.


TEMPERATURE, C
0
4
8
12
16
0
60
120
180
240
300
PRESSURE, DB
REF. NO. 78 - 3 - 69
50-0.0 N 145-0.0 W
MO.-4 DAY-23 GMT-17.3
31
32
33
34
35
SALINITY, 0/00

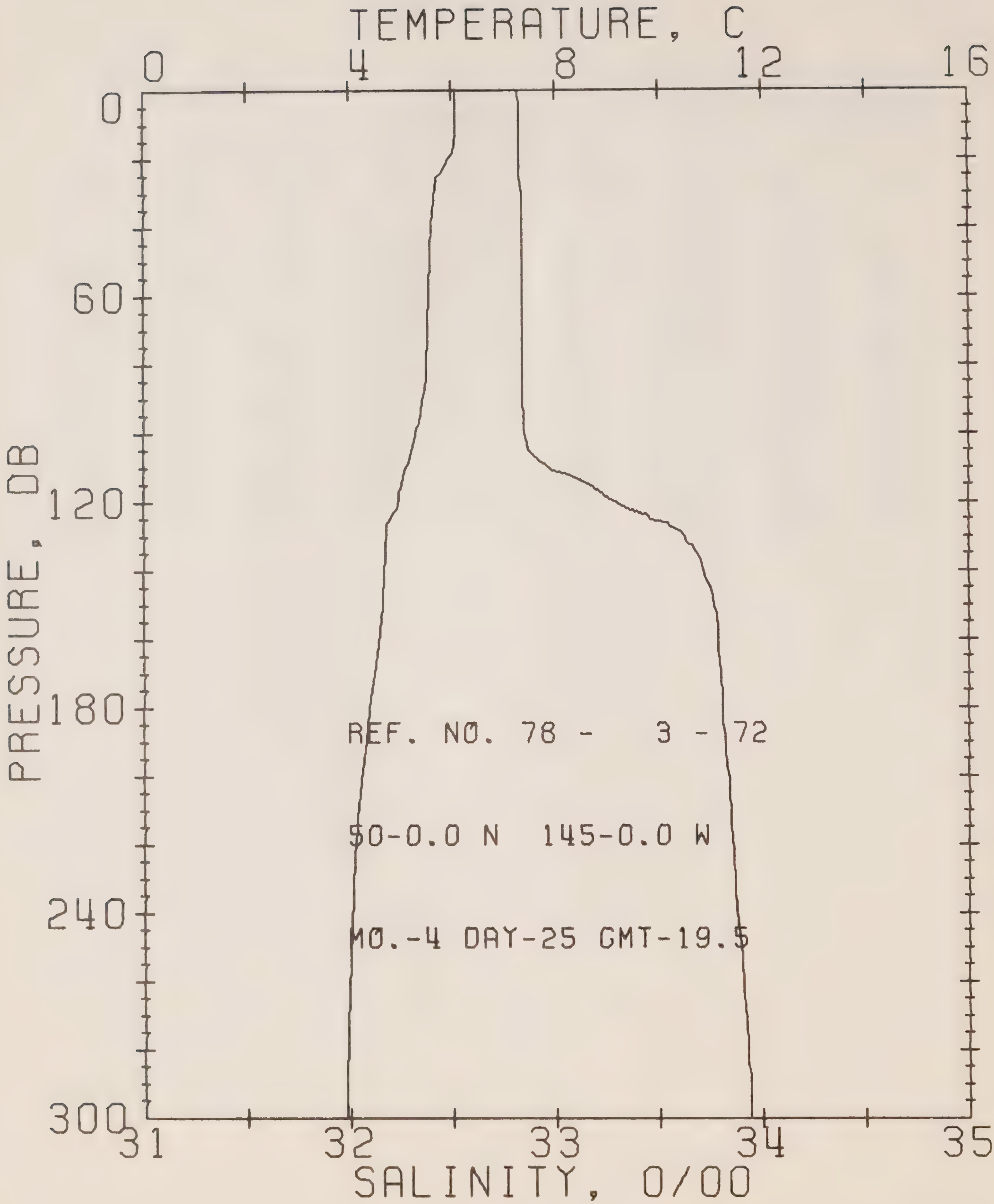
OFFSHCRE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 69 DATE 23/ 4/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.3
RESULTS OF STP CAST 89 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.84	32.81	0	25.87	214.1	0.0	0.0	1472.
10	5.83	32.81	10	25.87	214.4	0.21	0.01	1472.
20	5.66	32.81.	20	25.89	212.5	0.43	0.04	1471.
30	5.52	32.82	30	25.91	210.2	0.64	0.10	1471.
50	5.42	32.83	50	25.93	208.7	1.06	0.27	1471.
75	5.40	32.83	75	25.94	208.6	1.58	0.60	1471.
100	4.93	33.20	99	26.28	175.9	2.07	1.04	1470.
125	4.68	33.66	124	26.67	139.1	2.47	1.49	1470.
150	4.50	33.79	149	26.79	127.9	2.80	1.95	1470.
175	4.31	33.82	174	26.84	123.6	3.11	2.47	1469.
200	4.14	33.83	199	26.87	121.3	3.42	3.06	1469.
225	4.09	33.86	223	26.89	119.0	3.72	3.71	1469.
250	4.00	33.89	248	26.93	115.8	4.01	4.42	1469.
300	3.91	33.94	298	26.98	111.5	4.58	6.01	1470.


TEMPERATURE, C
0
4
8
12
16
PRESSURE, DB
0
60
120
180
240
300
REF. NO. 78 - 3 - 70
50-0.0 N 145-0.0 W
MO.-4 DAY-24 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

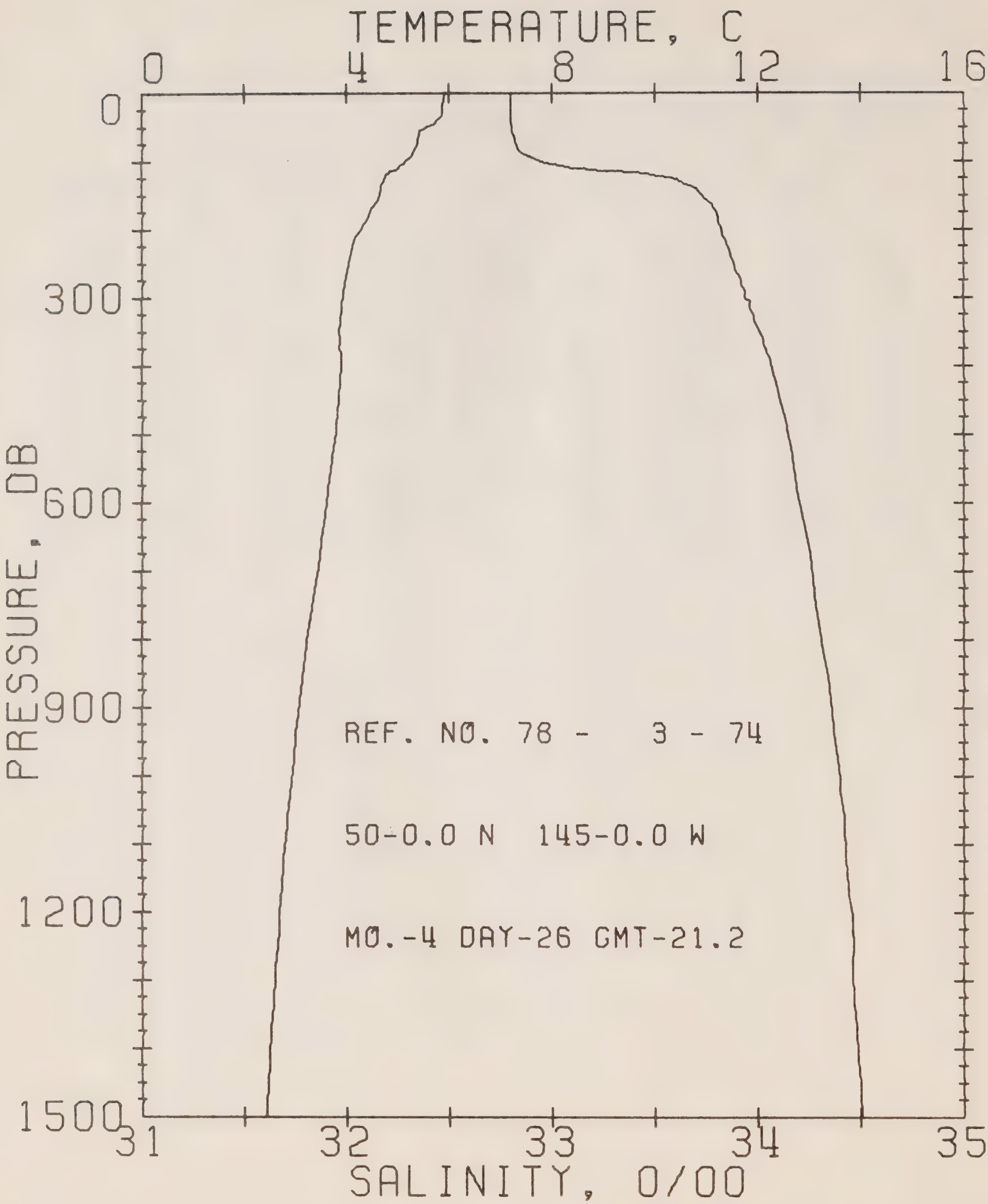
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 70 DATE 24/ 4/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.2
RESULTS OF STP CAST 93 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	6.04	32.81	0	25.84	216.4	0.0	0.0	1472.
10	6.05	32.81	10	25.84	216.9	0.22	0.01	1473.
20	5.83	32.82	20	25.88	213.5	0.43	0.04	1472.
30	5.66	32.83	30	25.91	211.1	0.64	0.10	1471.
50	5.43	32.83	50	25.93	208.7	1.06	0.27	1471.
75	5.40	32.83	75	25.94	208.6	1.58	0.60	1471.
100	5.20	32.86	99	25.98	204.4	2.10	1.06	1471.
125	4.73	33.59	124	26.61	145.1	2.55	1.57	1470.
150	4.54	33.78	149	26.78	129.1	2.88	2.04	1470.
175	4.28	33.81	174	26.84	124.0	3.20	2.56	1469.
200	4.13	33.83	199	26.87	120.9	3.50	3.14	1469.
225	4.04	33.86	223	26.90	118.2	3.80	3.79	1469.
250	3.98	33.89	248	26.93	115.9	4.09	4.50	1469.
300	3.90	33.94	298	26.98	111.4	4.66	6.09	1470.


TEMPERATURE, C
0
4
8
12
16
0
60
120
180
240
300
PRESSURE, DB
REF. NO. 78 - 3 - 72
50-0.0 N 145-0.0 W
MO.-4 DAY-25 GMT-19.5
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 72 DATE 25/ 4/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 19.5
RESULTS OF STP CAST 83 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	6.08	32.82	0	25.85	216.2	0.0	0.0	1473.
10	6.07	32.83	10	25.86	215.7	0.22	0.01	1473.
20	5.93	32.83	20	25.87	214.1	0.43	0.04	1472.
30	5.66	32.84	30	25.91	210.5	0.64	0.10	1471.
50	5.56	32.84	50	25.93	209.5	1.06	0.27	1471.
75	5.51	32.84	75	25.93	209.1	1.59	0.60	1471.
100	5.29	32.85	99	25.96	206.1	2.11	1.07	1471.
125	4.78	33.46	124	26.50	155.1	2.57	1.60	1470.
150	4.63	33.77	149	26.76	130.8	2.92	2.08	1470.
175	4.41	33.81	174	26.82	125.7	3.24	2.61	1470.
200	4.22	33.84	199	26.86	121.6	3.55	3.20	1469.
225	4.09	33.86	223	26.90	118.6	3.85	3.85	1469.
250	4.01	33.89	248	26.93	115.6	4.14	4.56	1469.
300	3.91	33.94	298	26.98	111.5	4.70	6.14	1470.


TEMPERATURE, C
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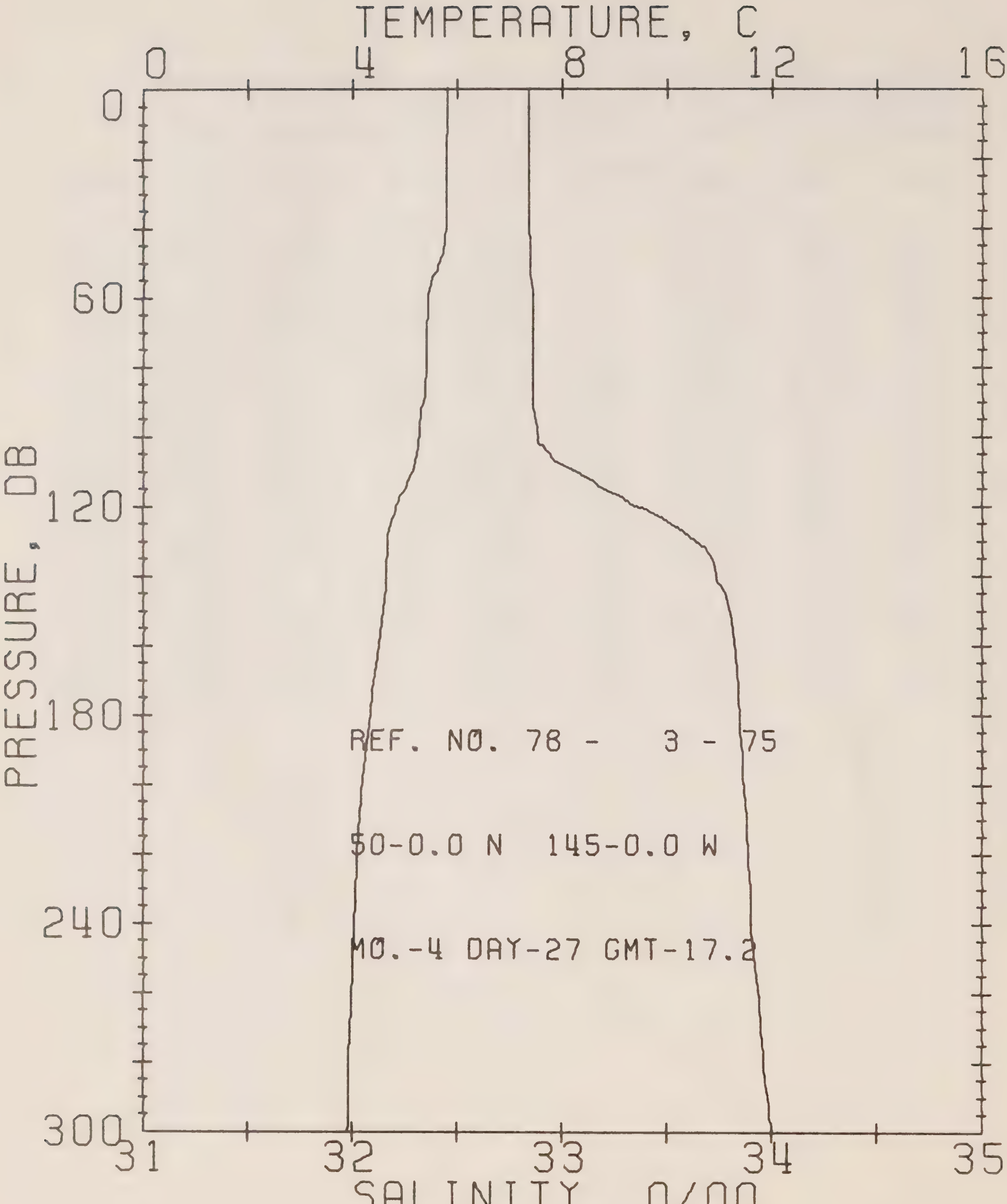
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 3 - 74
50-0.0 N 145-0.0 W
MO.-4 DAY-26 GMT-21.2
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 74 DATE 26/ 4/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 21.2
RESULTS OF STP CAST 149 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.91	32.80	0	25.85	215.7	0.0	0.0	1472.
10	5.89	32.80	10	25.85	215.8	0.22	0.01	1472.
20	5.87	32.80	20	25.86	215.7	0.43	0.04	1472.
30	5.86	32.80	30	25.86	215.6	0.65	0.10	1472.
50	5.59	32.81	50	25.90	212.2	1.08	0.27	1471.
75	5.38	32.82	75	25.93	208.9	1.60	0.61	1471.
100	5.16	32.95	99	26.06	197.2	2.11	1.06	1471.
125	4.73	33.58	124	26.60	145.8	2.55	1.56	1470.
150	4.63	33.72	149	26.73	134.1	2.89	2.04	1470.
175	4.45	33.80	174	26.81	126.7	3.22	2.58	1470.
200	4.26	33.82	199	26.85	123.3	3.53	3.18	1470.
225	4.10	33.85	223	26.89	119.4	3.83	3.84	1469.
250	4.02	33.88	248	26.92	116.7	4.13	4.55	1470.
300	3.91	33.94	298	26.98	111.5	4.70	6.15	1470.
400	3.89	34.06	397	27.08	103.1	5.77	9.95	1472.
500	3.77	34.14	496	27.15	96.4	6.76	14.51	1473.
600	3.60	34.20	595	27.22	91.1	7.70	19.76	1474.
800	3.21	34.31	793	27.34	80.4	9.41	31.94	1476.
1000	2.92	34.40	990	27.44	71.9	10.93	45.82	1478.
1200	2.68	34.46	1188	27.50	66.2	12.31	61.31	1480.
1500	2.41	34.51	1483	27.57	60.8	14.23	87.63	1484.


TEMPERATURE, C
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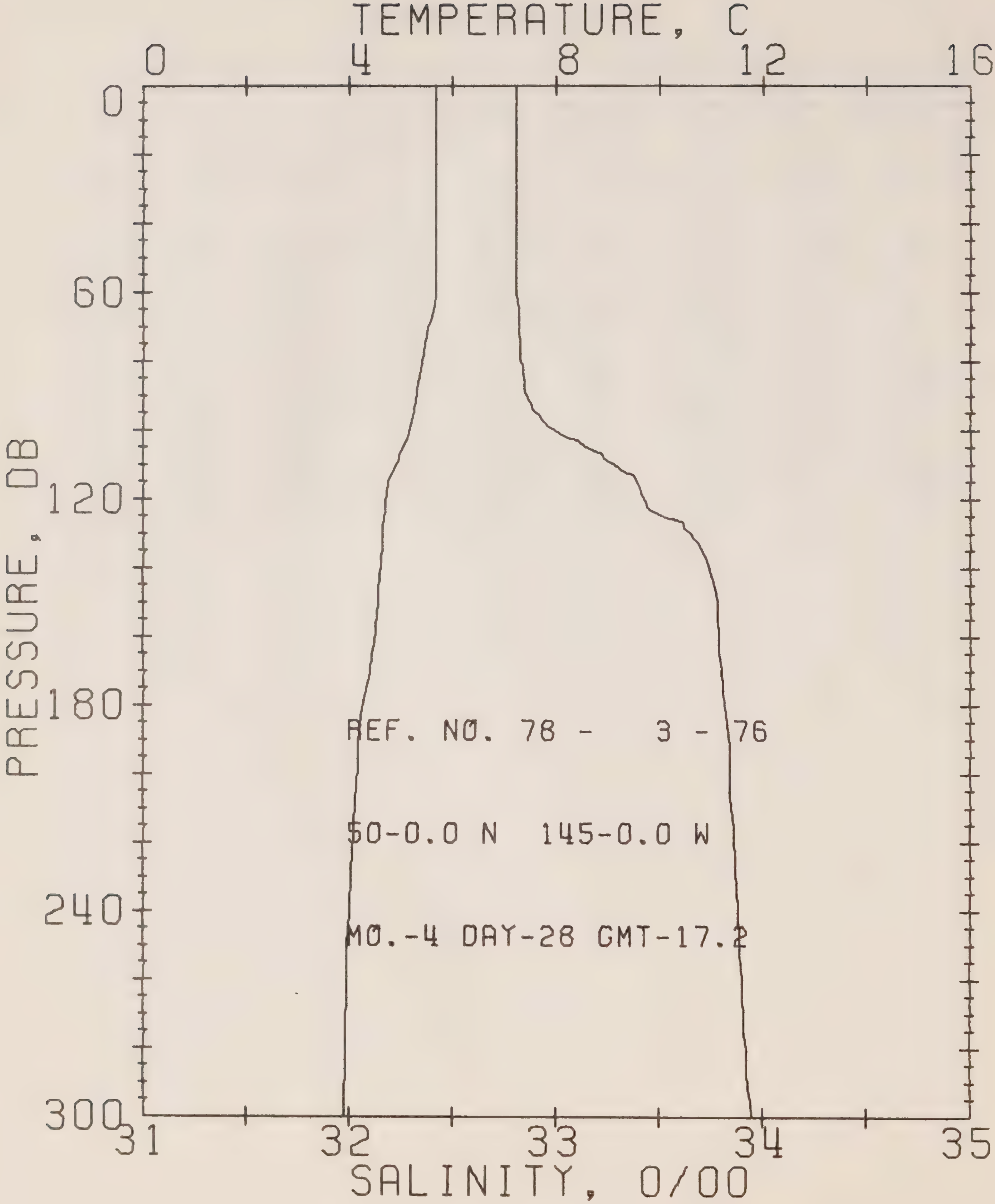
4
8
12
16
PRESSURE, DB
0
60
120
180
240
300
REF. NO. 78 - 3 - 75
50-0.0 N 145-0.0 W
MO.-4 DAY-27 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 75 DATE 27/ 4/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.2
RESULTS OF STP CAST 70 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.80	32.84	0	25.90	211.4	0.0	0.0	1471.
10	5.80	32.84	10	25.90	211.7	0.21	0.01	1472.
20	5.78	32.84	20	25.90	211.6	0.42	0.04	1472.
30	5.78	32.84	30	25.90	211.7	0.63	0.10	1472.
50	5.66	32.85	50	25.92	209.8	1.06	0.27	1472.
75	5.41	32.86	75	25.96	206.5	1.58	0.60	1471.
100	5.27	32.88	99	25.99	203.3	2.09	1.06	1471.
125	4.71	33.52	124	26.56	149.8	2.54	1.57	1470.
150	4.58	33.80	149	26.79	127.9	2.88	2.05	1470.
175	4.36	33.84	174	26.85	122.6	3.19	2.56	1470.
200	4.18	33.86	199	26.89	119.2	3.50	3.14	1469.
225	4.07	33.89	223	26.92	116.2	3.79	3.78	1469.
250	4.01	33.91	248	26.95	114.0	4.08	4.47	1469.
300	3.90	34.00	298	27.03	106.9	4.63	6.02	1470.



TEMPERATURE, C
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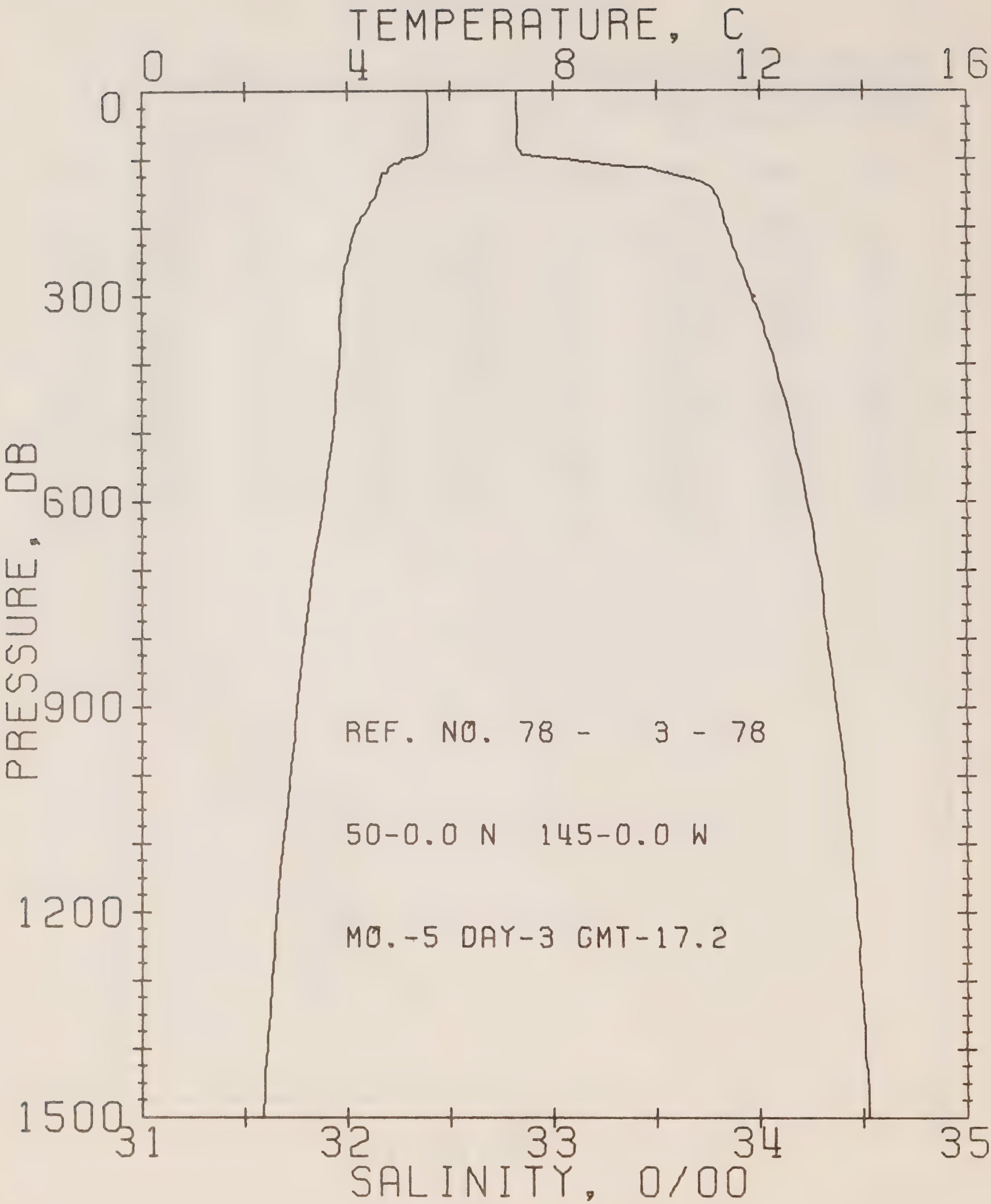
4
8
12
16
0
60
120
180
240
300
PRESSURE, DB
REF. NO. 78 - 3 - 76
50-0.0 N 145-0.0 W
MO.-4 DAY-28 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 76 DATE 28/ 4/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.2
RESULTS OF STP CAST 71 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.69	32.81	0	25.89	212.4	0.0	0.0	1471.
10	5.69	32.81	10	25.89	212.8	0.21	0.01	1471.
20	5.69	32.81	20	25.89	212.9	0.43	0.04	1471.
30	5.69	32.81	30	25.89	213.0	0.64	0.10	1471.
50	5.69	32.81	50	25.89	213.1	1.06	0.27	1472.
75	5.47	32.83	75	25.93	209.6	1.59	0.61	1471.
100	5.16	32.99	99	26.09	194.3	2.11	1.07	1471.
125	4.66	33.52	124	26.57	149.4	2.53	1.54	1470.
150	4.55	33.78	149	26.78	128.9	2.86	2.02	1470.
175	4.31	33.81	174	26.83	124.3	3.18	2.54	1469.
200	4.13	33.84	199	26.88	120.5	3.49	3.12	1469.
225	4.04	33.87	223	26.91	117.7	3.79	3.77	1469.
250	3.96	33.89	248	26.93	115.3	4.08	4.48	1469.
300	3.88	33.95	298	26.99	110.5	4.64	6.07	1470.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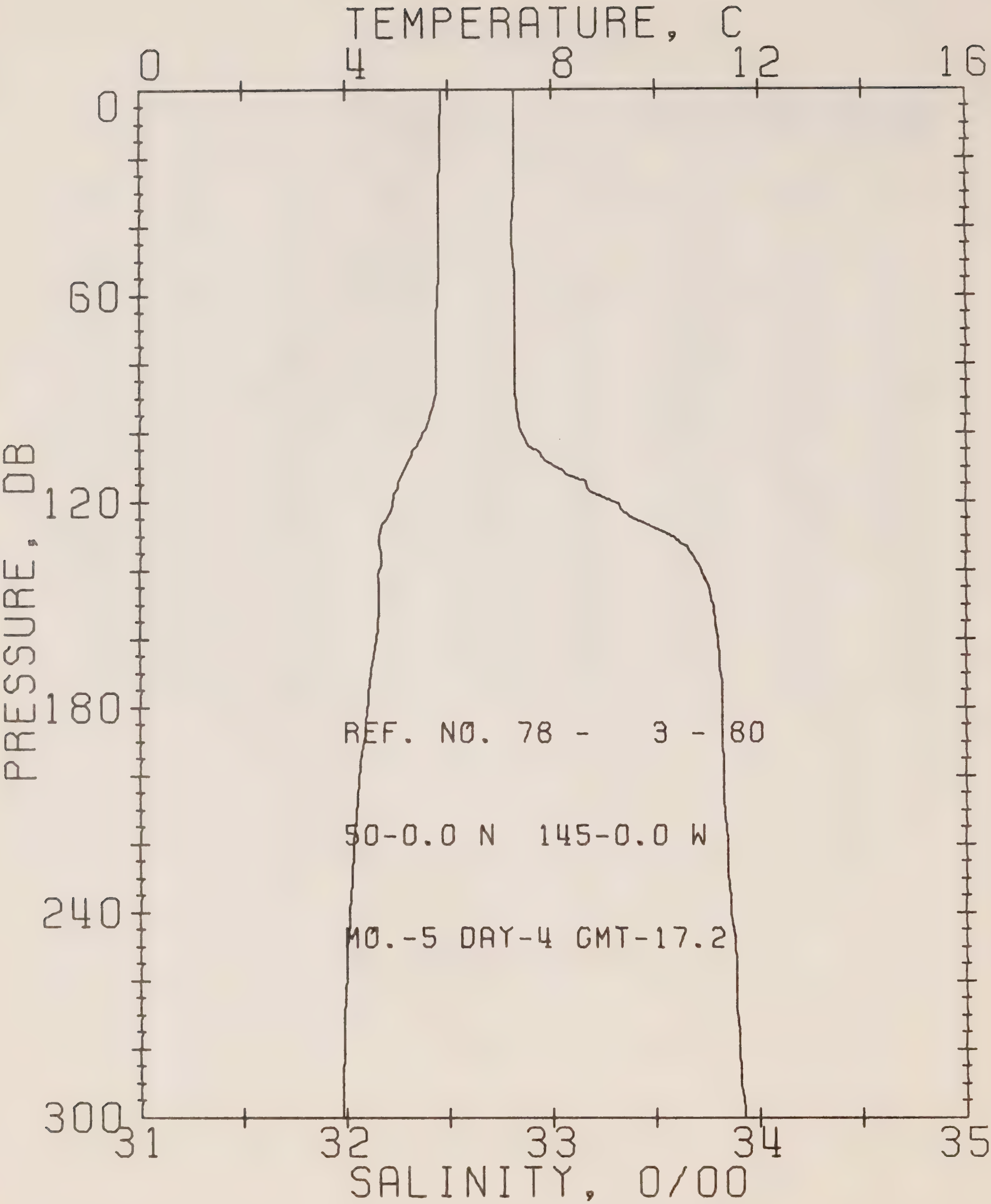
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 3 - 78
50-0.0 N 145-0.0 W
MO.-5 DAY-3 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 78 DATE 3/ 5/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.2
RESULTS OF STP CAST 136 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.55	32.82	0	25.91	210.1	0.0	0.0	1470.
10	5.56	32.82	10	25.91	210.5	0.21	0.01	1471.
20	5.56	32.82	20	25.91	210.6	0.42	0.04	1471.
30	5.56	32.82	30	25.91	210.7	0.63	0.10	1471.
50	5.56	32.83	50	25.92	210.2	1.05	0.27	1471.
75	5.56	32.82	75	25.91	211.3	1.58	0.60	1472.
100	5.13	33.03	99	26.13	190.6	2.10	1.07	1471.
125	4.65	33.60	124	26.63	143.0	2.51	1.53	1470.
150	4.56	33.78	149	26.78	129.0	2.84	2.00	1470.
175	4.37	33.81	174	26.83	124.7	3.16	2.52	1470.
200	4.17	33.83	199	26.87	121.2	3.46	3.11	1469.
225	4.06	33.86	223	26.90	118.2	3.76	3.76	1469.
250	3.98	33.89	248	26.93	115.3	4.05	4.46	1469.
300	3.89	33.96	298	27.00	109.9	4.62	6.04	1470.
400	3.84	34.07	397	27.09	101.6	5.67	9.79	1471.
500	3.71	34.16	496	27.17	94.8	6.65	14.28	1473.
600	3.53	34.22	595	27.24	88.7	7.57	19.41	1474.
800	3.15	34.33	793	27.36	78.4	9.22	31.21	1475.
1000	2.87	34.41	990	27.45	70.3	10.71	44.81	1478.
1200	2.61	34.47	1188	27.52	64.4	12.06	59.87	1480.
1500	2.34	34.53	1483	27.59	58.5	13.89	85.10	1484.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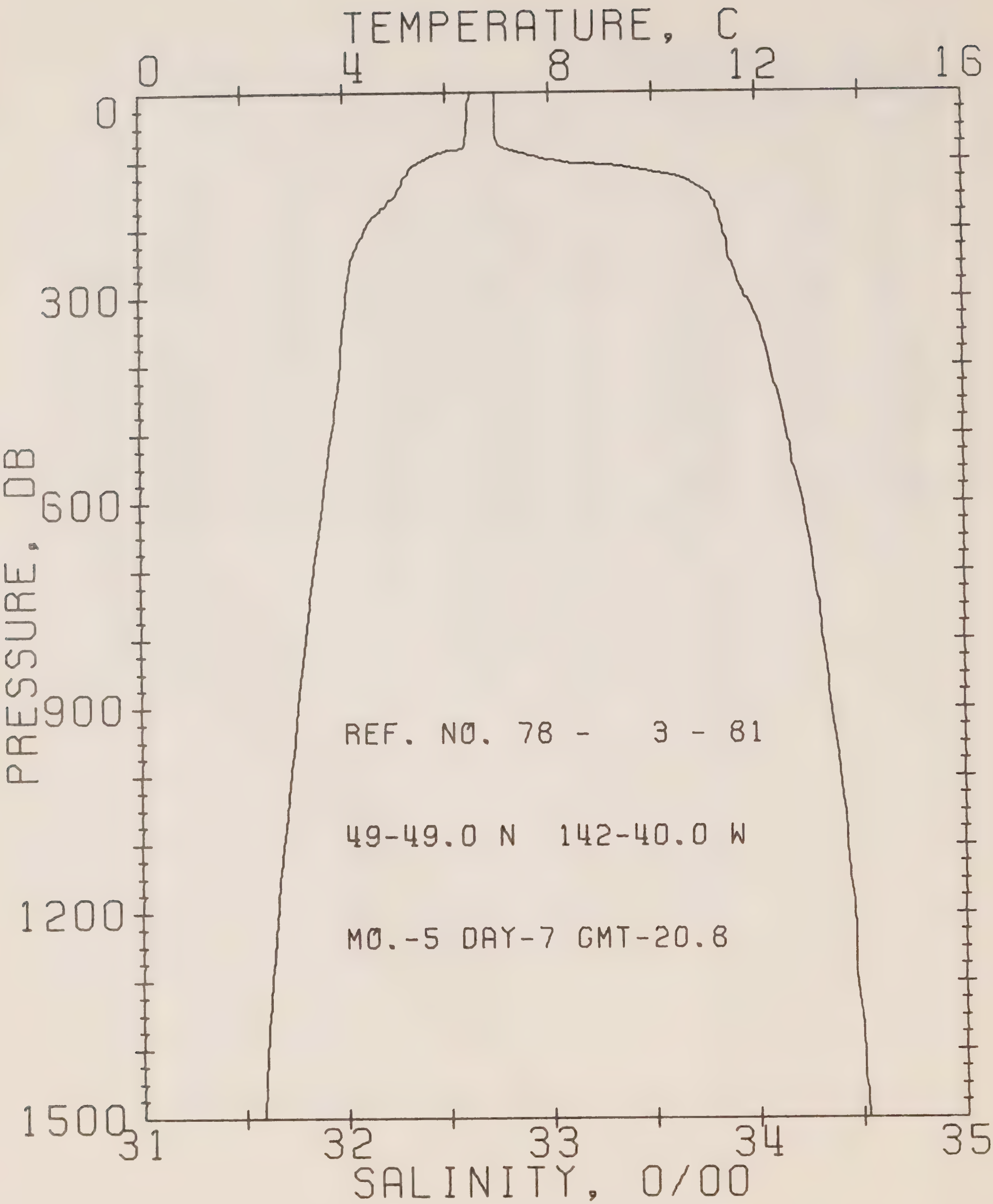
60
120
180
240
300
PRESSURE, DB
REF. NO. 78 - 3 - 80
50-0.0 N 145-0.0 W
MO.-5 DAY-4 GMT-17.2
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 80 DATE 4/ 5/78 STATION P
POSITION 50- 0.0N, 145- 0.0W GMT 17.2
RESULTS OF STP CAST 88 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	5.88	32.82	0	25.87	213.8	0.0	0.0	1472.
10	5.84	32.82	10	25.88	213.8	0.21	0.01	1472.
20	5.83	32.82	20	25.88	213.7	0.43	0.04	1472.
30	5.81	32.82	30	25.88	213.5	0.64	0.10	1472.
50	5.80	32.82	50	25.88	214.0	1.07	0.27	1472.
75	5.77	32.82	75	25.88	213.6	1.60	0.61	1472.
100	5.50	32.85	99	25.94	208.5	2.13	1.09	1472.
125	4.77	33.40	124	26.46	159.5	2.60	1.62	1470.
150	4.63	33.77	149	26.77	130.1	2.95	2.10	1470.
175	4.44	33.82	174	26.83	124.9	3.26	2.63	1470.
200	4.26	33.83	199	26.85	122.6	3.57	3.22	1470.
225	4.12	33.85	223	26.89	119.7	3.88	3.88	1469.
250	4.01	33.88	248	26.92	116.5	4.17	4.59	1469.
300	3.92	33.93	298	26.97	112.4	4.75	6.20	1470.


TEMPERATURE, C
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12
16
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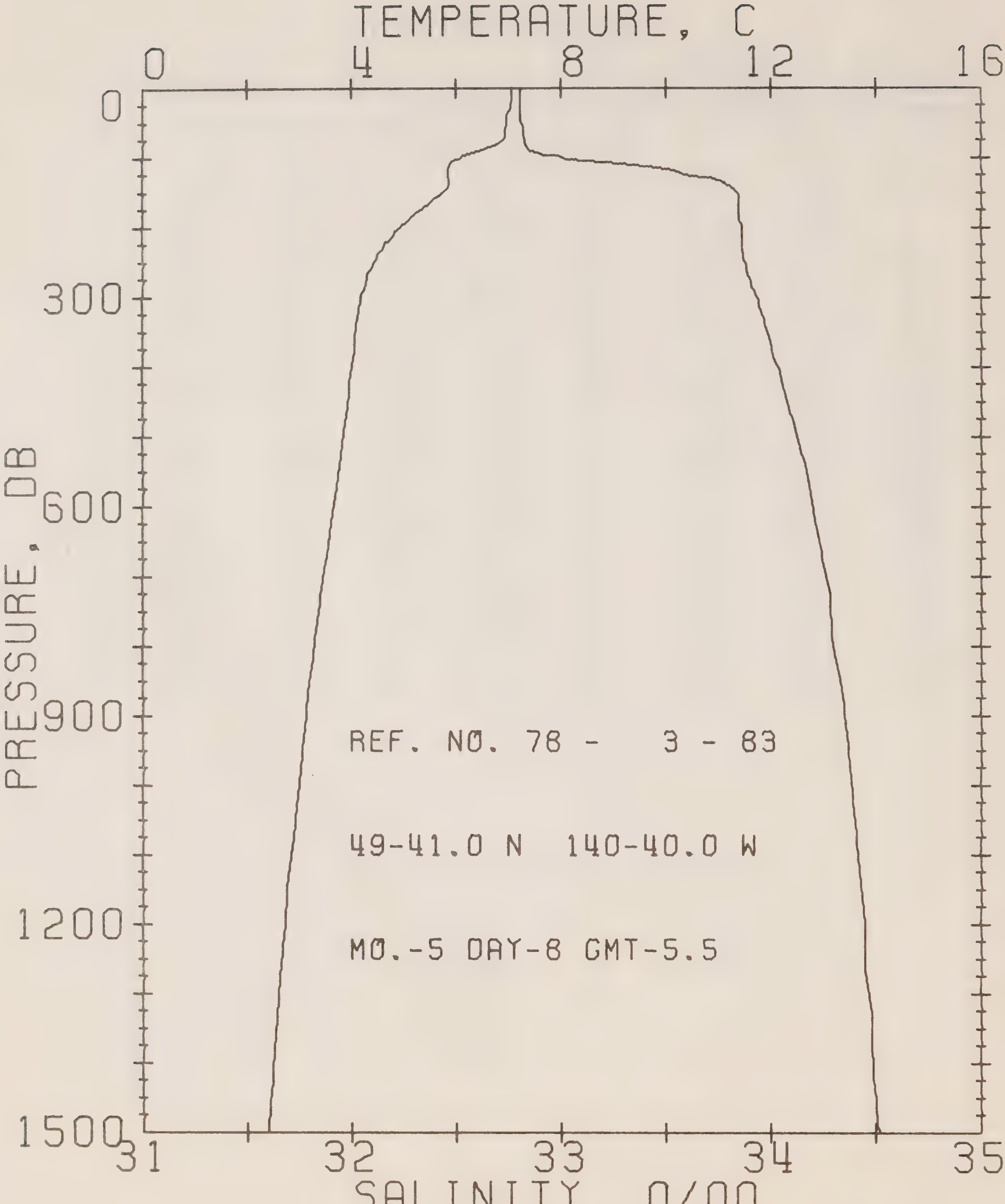
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 3 - 81
49-49.0 N 142-40.0 W
MO.-5 DAY-7 GMT-20.8
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 81 DATE 7/ 5/78 STATION 12
POSITION 49-49.0N, 142-40.0W GMT 20.8
RESULTS OF STP CAST 155 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	6.48	32.74	0	25.73	226.9	0.0	0.0	1474.
10	6.44	32.74	10	25.74	226.8	0.23	0.01	1474.
20	6.44	32.74	20	25.74	226.9	0.45	0.05	1474.
30	6.42	32.74	30	25.74	226.8	0.68	0.10	1474.
50	6.41	32.74	50	25.74	226.9	1.13	0.29	1475.
75	6.38	32.75	75	25.75	226.1	1.70	0.65	1475.
100	5.53	33.03	99	26.08	195.4	2.23	1.12	1472.
125	5.18	33.64	124	26.60	146.0	2.65	1.60	1472.
150	5.01	33.77	149	26.73	134.4	3.00	2.09	1472.
175	4.67	33.81	174	26.80	127.8	3.32	2.63	1471.
200	4.40	33.84	199	26.85	123.3	3.64	3.22	1470.
225	4.24	33.86	223	26.88	120.3	3.94	3.88	1470.
250	4.12	33.88	248	26.91	117.9	4.24	4.61	1470.
300	4.02	33.94	298	26.97	112.6	4.82	6.22	1470.
400	3.90	34.06	397	27.08	103.1	5.88	10.02	1472.
500	3.73	34.14	496	27.16	96.0	6.88	14.58	1473.
600	3.55	34.22	595	27.23	89.3	7.81	19.78	1474.
800	3.21	34.31	793	27.34	80.2	9.49	31.77	1476.
1000	2.90	34.40	990	27.44	71.8	11.01	45.67	1478.
1200	2.63	34.46	1188	27.51	65.1	12.38	60.97	1480.
1500	2.34	34.53	1484	27.59	58.5	14.24	86.47	1484.


TEMPERATURE, C
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16
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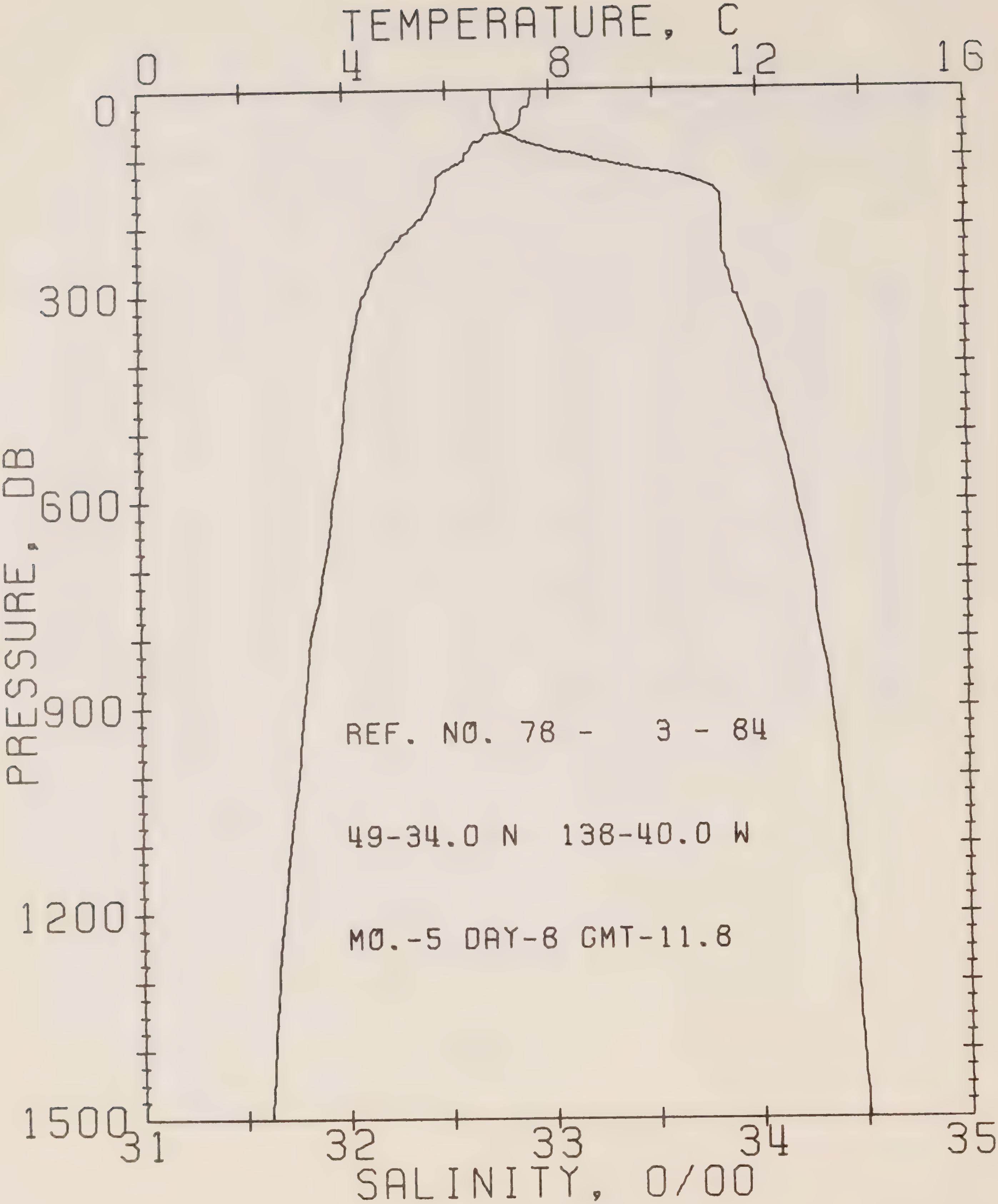
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 3 - 83
49-41.0 N 140-40.0 W
MO.-5 DAY-8 GMT-5.5
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 83 DATE 8/ 5/78 STATION 11
POSITION 49-41.0N, 140-40.0W GMT 5.5
RESULTS OF STP CAST 138 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.07	32.81	0	25.71	229.1	0.0	0.0	1476.
10	7.06	32.81	10	25.71	229.4	0.23	0.01	1477.
20	7.05	32.81	20	25.71	229.3	0.46	0.05	1477.
30	7.01	32.81	30	25.72	228.9	0.69	0.11	1477.
50	6.95	32.81	50	25.73	228.5	1.15	0.29	1477.
75	6.87	32.83	75	25.75	226.5	1.71	0.65	1477.
100	6.09	33.01	99	26.00	203.4	2.26	1.14	1474.
125	5.85	33.62	124	26.51	155.3	2.70	1.64	1475.
150	5.73	33.84	149	26.69	138.0	3.06	2.15	1475.
175	5.32	33.85	174	26.75	132.4	3.40	2.70	1474.
200	4.91	33.86	199	26.81	127.3	3.72	3.32	1472.
225	4.61	33.86	223	26.84	124.3	4.04	4.01	1472.
250	4.41	33.87	248	26.87	121.5	4.34	4.75	1471.
300	4.17	33.93	298	26.94	115.0	4.94	6.41	1471.
400	3.99	34.03	397	27.04	106.5	6.04	10.35	1472.
500	3.83	34.12	496	27.13	98.9	7.07	15.06	1473.
600	3.65	34.20	595	27.21	92.1	8.02	20.38	1474.
800	3.27	34.29	793	27.32	82.1	9.75	32.68	1476.
1000	2.97	34.39	990	27.42	73.5	11.29	46.80	1478.
1200	2.71	34.45	1188	27.50	67.1	12.70	62.54	1480.
1500	2.40	34.52	1484	27.58	59.9	14.62	88.88	1484.


TEMPERATURE, C
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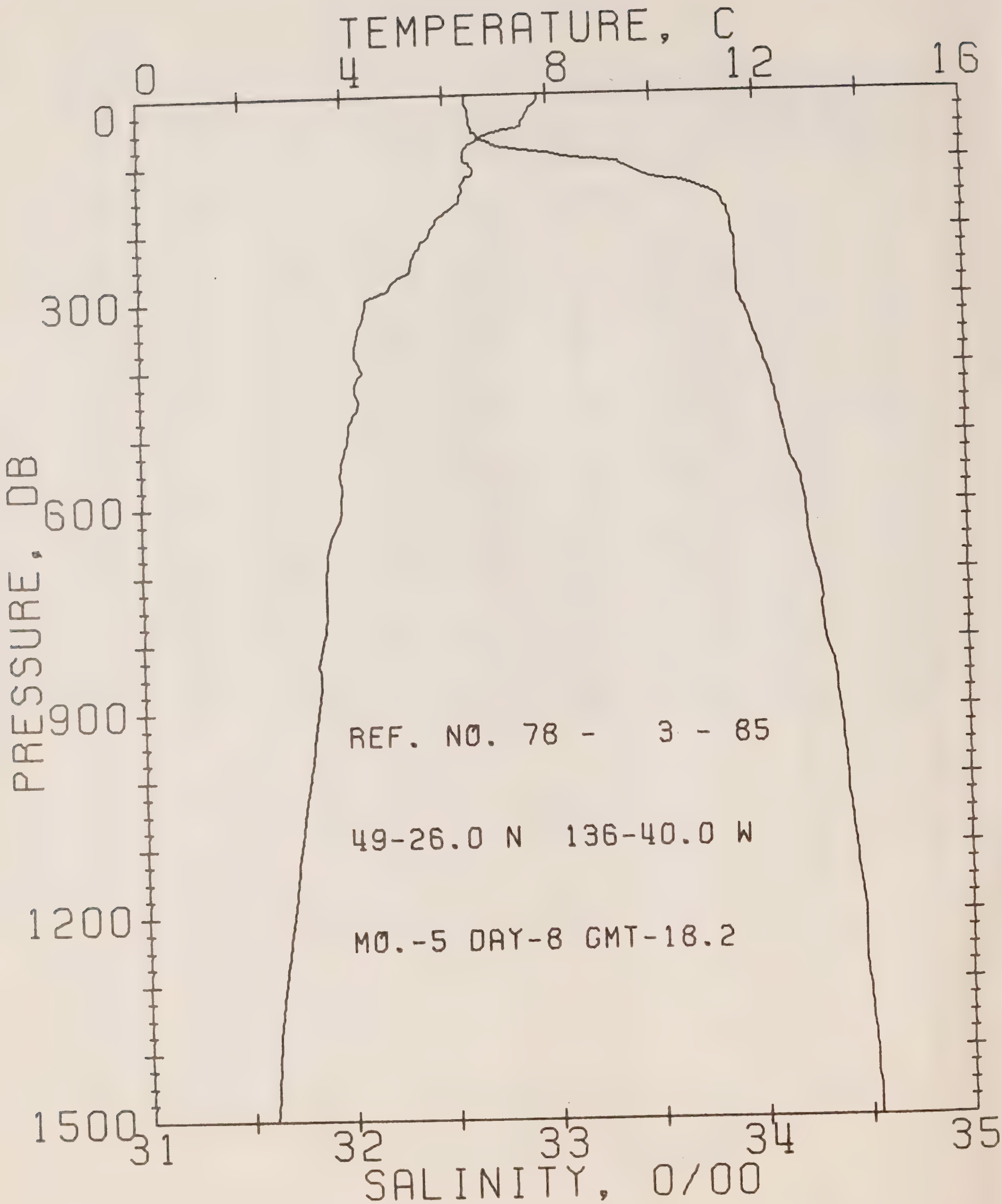
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 3 - 84
49-34.0 N 138-40.0 W
MO.-5 DAY-8 GMT-11.8
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 84 DATE 8/ 5/78 STATION 10
POSITION 49-34.0N, 138-40.0W GMT 11.8
RESULTS OF STP CAST 156 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.65	32.72	0	25.56	243.4	0.0	0.0	1479.
10	7.65	32.72	10	25.56	243.8	0.24	0.01	1479.
20	7.64	32.72	20	25.56	243.9	0.49	0.05	1479.
30	7.47	32.73	30	25.59	240.9	0.73	0.11	1478.
50	7.41	32.75	50	25.62	239.1	1.21	0.31	1479.
75	6.63	32.87	75	25.82	220.2	1.79	0.67	1476.
100	6.35	33.19	99	26.11	192.9	2.31	1.14	1476.
125	5.85	33.61	124	26.50	156.0	2.75	1.64	1475.
150	5.76	33.80	149	26.66	140.8	3.12	2.15	1475.
175	5.62	33.83	174	26.70	137.5	3.46	2.73	1475.
200	5.32	33.83	199	26.74	134.2	3.80	3.38	1474.
225	4.97	33.83	223	26.78	130.6	4.13	4.10	1473.
250	4.72	33.84	248	26.81	127.2	4.46	4.88	1472.
300	4.36	33.88	298	26.88	120.7	5.07	6.61	1472.
400	4.08	34.01	397	27.01	109.1	6.21	10.65	1472.
500	3.95	34.10	496	27.10	101.5	7.26	15.46	1474.
600	3.74	34.18	595	27.19	94.2	8.24	20.93	1474.
800	3.29	34.29	793	27.32	82.6	10.00	33.49	1476.
1000	3.02	34.38	990	27.41	74.5	11.57	47.81	1478.
1200	2.73	34.44	1188	27.49	67.7	12.99	63.73	1480.
1500	2.44	34.51	1484	27.57	61.1	14.92	90.31	1484.



TEMPERATURE, C
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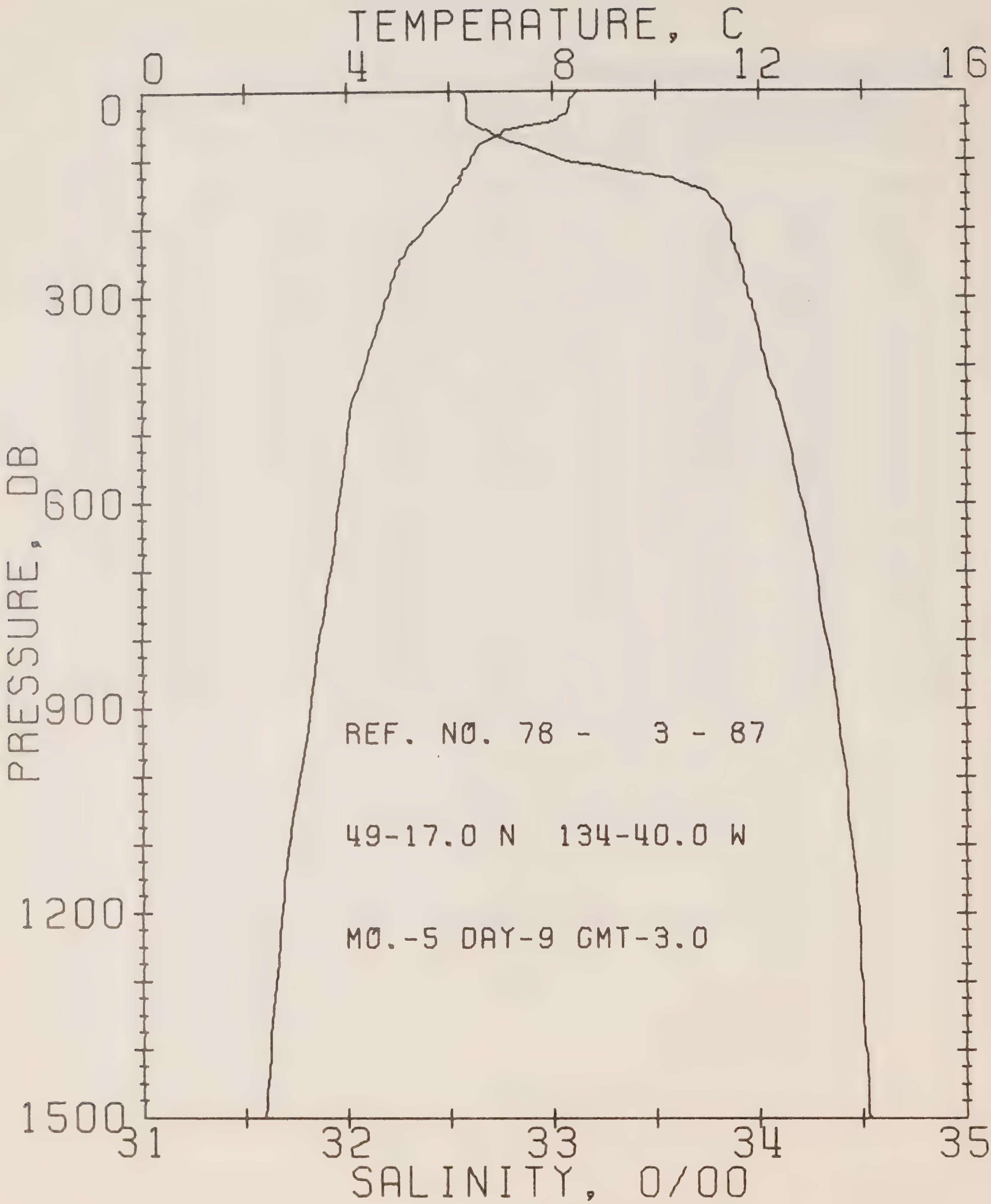
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 3 - 85
49-26.0 N 136-40.0 W
MO.-5 DAY-8 GMT-18.2
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 85 DATE 8/ 5/78 STATION 9
POSITION 49-26.0N, 136-40.0W GMT 18.2
RESULTS OF STP CAST 202 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.80	32.61	0	25.45	253.7	0.0	0.0	1479.
10	7.82	32.61	10	25.45	254.3	0.25	0.01	1479.
20	7.66	32.61	20	25.48	252.0	0.51	0.05	1479.
30	7.60	32.62	30	25.49	250.9	0.76	0.12	1479.
50	7.40	32.64	50	25.53	247.3	1.26	0.32	1478.
75	6.47	32.75	75	25.74	227.2	1.85	0.70	1475.
100	6.45	33.34	99	26.21	183.3	2.37	1.16	1476.
125	6.39	33.52	124	26.36	169.6	2.82	1.67	1477.
150	6.29	33.81	149	26.60	147.0	3.20	2.21	1477.
175	5.97	33.87	174	26.69	138.7	3.56	2.80	1476.
200	5.69	33.88	199	26.73	134.9	3.90	3.45	1476.
225	5.46	33.90	223	26.77	130.9	4.24	4.17	1475.
250	5.32	33.90	248	26.79	129.6	4.56	4.96	1475.
300	4.44	33.91	298	26.90	119.3	5.19	6.71	1472.
400	4.32	34.04	397	27.01	109.7	6.32	10.74	1473.
500	4.04	34.12	496	27.11	100.7	7.37	15.54	1474.
600	3.89	34.22	595	27.20	93.1	8.33	20.95	1475.
800	3.49	34.31	793	27.31	83.4	10.08	33.40	1477.
1000	3.19	34.41	990	27.42	74.2	11.64	47.70	1479.
1200	2.83	34.48	1188	27.51	66.1	13.05	63.41	1481.
1500	2.40	34.54	1484	27.60	58.5	14.90	88.91	1484.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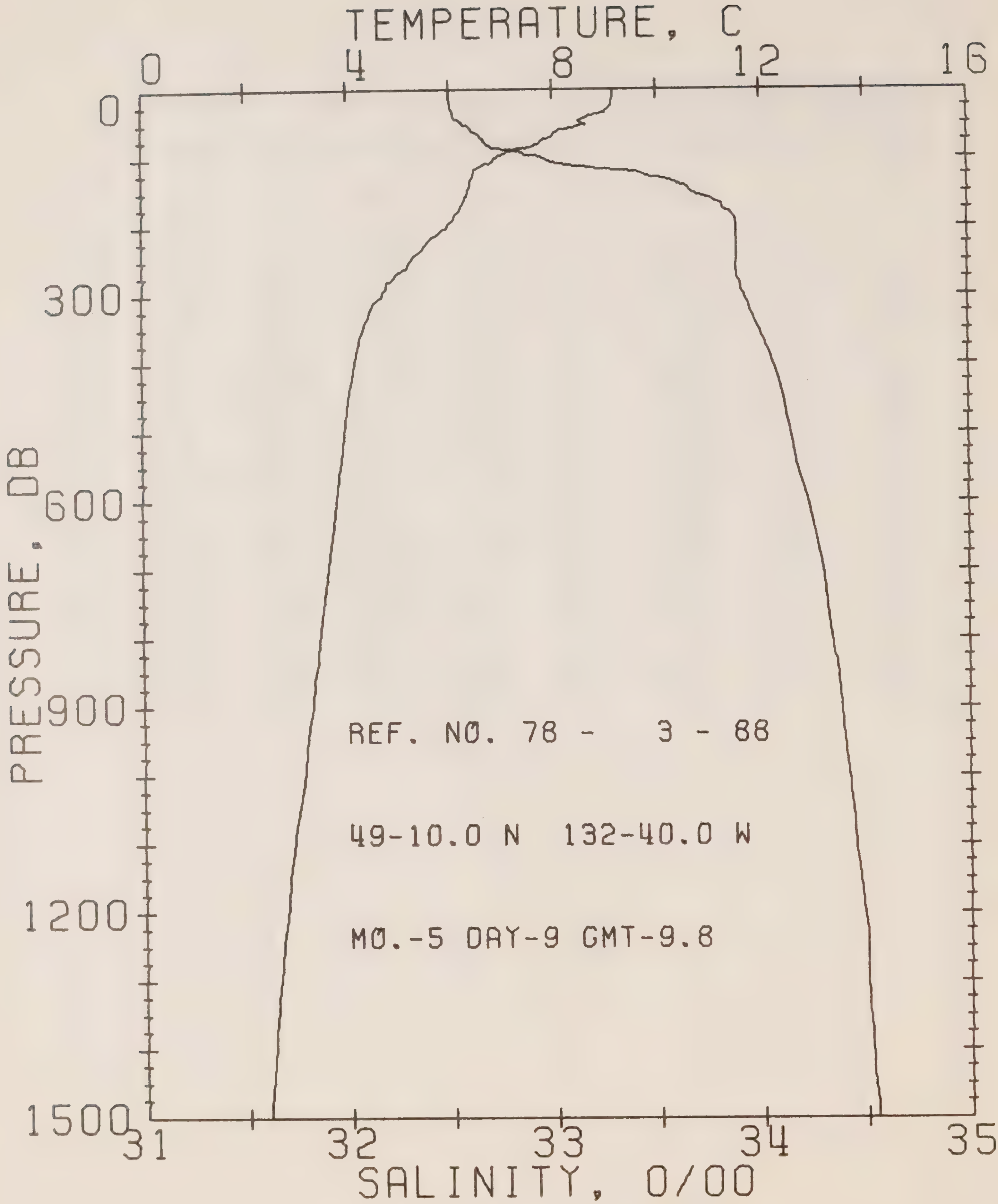
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 3 - 87
49-17.0 N 134-40.0 W
MO.-5 DAY-9 GMT-3.0
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 87 DATE 9/ 5/78 STATION 8
POSITION 49-17.0N, 134-40.0W GMT 3.0
RESULTS OF STP CAST 202 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	8.47	32.55	0	25.31	267.5	0.0	0.0	1482.
10	8.37	32.58	10	25.35	264.2	0.27	0.01	1481.
20	8.32	32.59	20	25.36	263.0	0.53	0.05	1481.
30	8.29	32.59	30	25.37	262.6	0.79	0.12	1481.
50	7.55	32.63	50	25.50	249.7	1.31	0.33	1479.
75	6.67	32.81	75	25.77	225.0	1.90	0.71	1476.
100	6.41	33.04	99	25.98	205.0	2.44	1.18	1476.
125	6.20	33.53	124	26.39	166.3	2.90	1.72	1476.
150	6.01	33.75	149	26.59	148.0	3.29	2.26	1476.
175	5.78	33.83	174	26.68	139.4	3.65	2.86	1475.
200	5.49	33.86	199	26.74	133.6	4.00	3.51	1475.
225	5.20	33.88	223	26.79	129.4	4.33	4.23	1474.
250	5.02	33.91	248	26.83	125.4	4.64	5.00	1474.
300	4.80	33.95	298	26.89	120.4	5.26	6.72	1474.
400	4.35	34.03	397	27.01	110.1	6.41	10.81	1474.
500	4.00	34.13	496	27.12	99.7	7.45	15.59	1474.
600	3.84	34.20	595	27.20	93.4	8.42	21.01	1475.
800	3.44	34.32	793	27.33	81.9	10.17	33.46	1477.
1000	3.05	34.42	990	27.44	71.7	11.71	47.53	1478.
1200	2.70	34.48	1188	27.52	64.7	13.07	62.78	1480.
1500	2.36	34.54	1484	27.60	58.0	14.92	88.20	1484.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12
16
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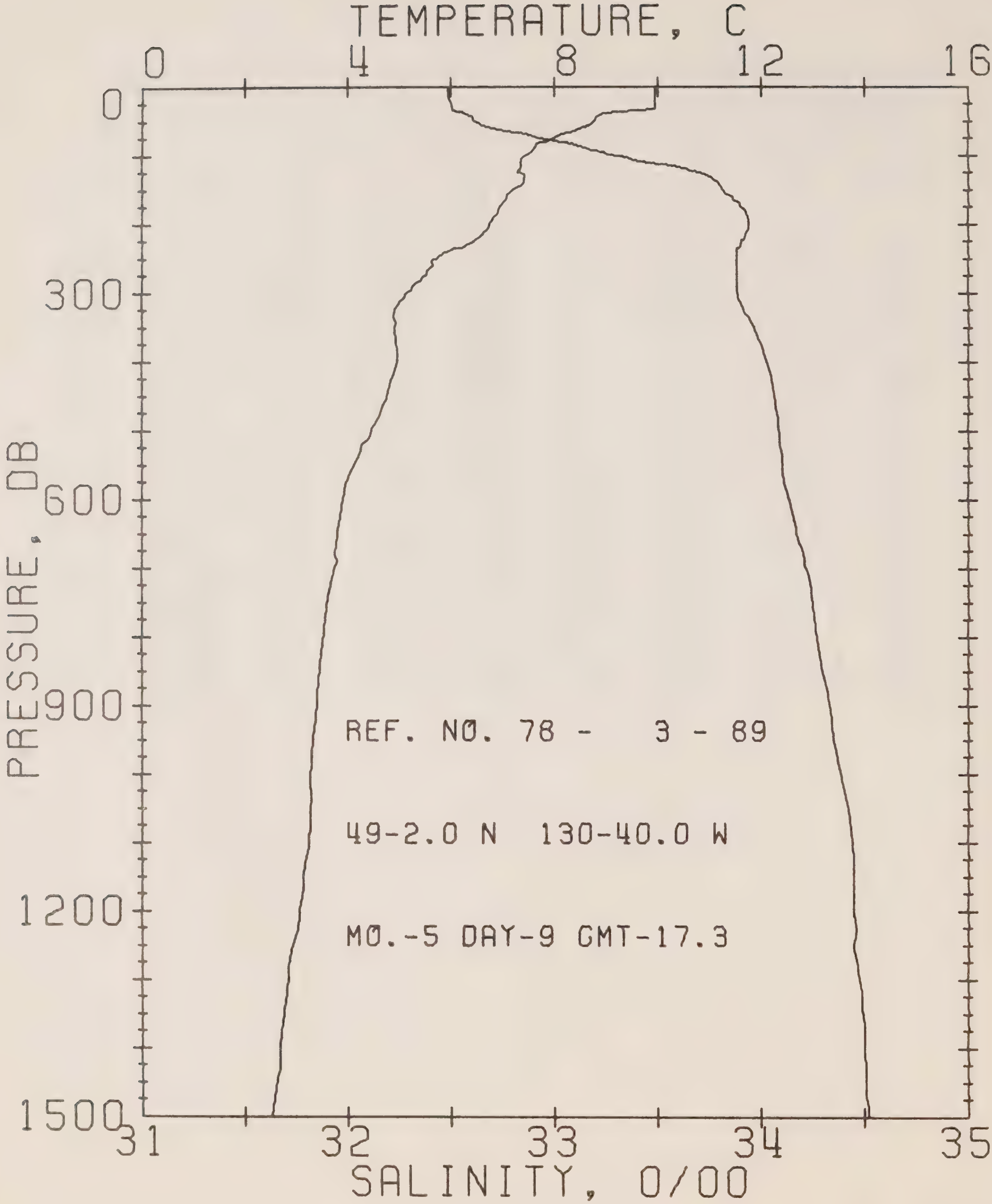
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 3 - 88
49-10.0 N 132-40.0 W
MO.-5 DAY-9 GMT-9.8
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 88   DATE 9/ 5/78   STATION 7
POSITION 49-10.0N, 132-40.0W   GMT 9.8
RESULTS OF STP CAST   167 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	9.16	32.50	0	25.16	281.3	0.0	0.0	1484.
10	9.16	32.50	10	25.16	281.7	0.28	0.01	1484.
20	9.15	32.50	20	25.17	281.5	0.56	0.06	1484.
30	9.04	32.51	30	25.19	279.5	0.84	0.13	1484.
50	8.59	32.56	50	25.30	269.2	1.39	0.35	1483.
75	7.81	32.66	75	25.49	251.1	2.04	0.76	1480.
100	6.39	32.95	99	25.85	217.5	2.63	1.29	1478.
125	6.45	33.45	124	26.30	175.4	3.13	1.86	1477.
150	6.34	33.67	149	26.48	157.9	3.54	2.43	1477.
175	6.20	33.83	174	26.63	144.5	3.91	3.05	1477.
200	5.95	33.89	199	26.71	137.4	4.27	3.72	1477.
225	5.54	33.89	223	26.76	132.7	4.60	4.45	1475.
250	5.23	33.89	248	26.79	129.3	4.93	5.25	1475.
300	4.67	33.92	298	26.88	121.1	5.56	7.00	1473.
400	4.13	34.06	397	27.05	106.1	6.69	11.01	1473.
500	3.92	34.14	496	27.14	98.3	7.70	15.66	1474.
600	3.76	34.22	595	27.22	91.4	8.65	20.99	1475.
800	3.44	34.34	793	27.34	80.8	10.36	33.16	1477.
1000	3.11	34.42	990	27.43	72.7	11.89	47.16	1479.
1200	2.75	34.49	1188	27.52	64.7	13.26	62.51	1481.
1500	2.39	34.55	1484	27.60	57.5	15.10	87.68	1484.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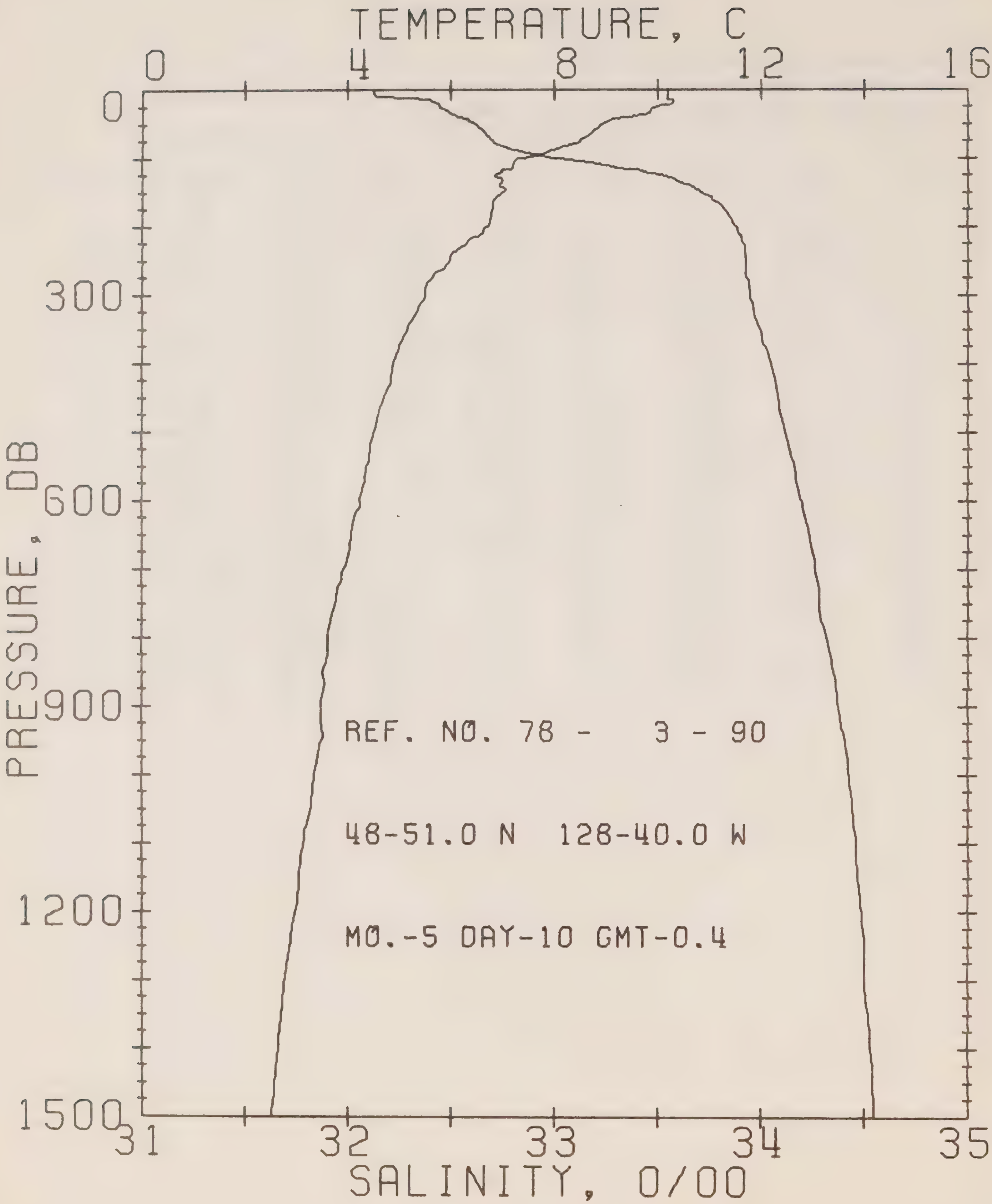
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NØ. 78 - 3 - 89
49-2.0 N 130-40.0 W
MØ.-5 DAY-9 GMT-17.3
31
32
33
34
35
SALINITY, 0/00

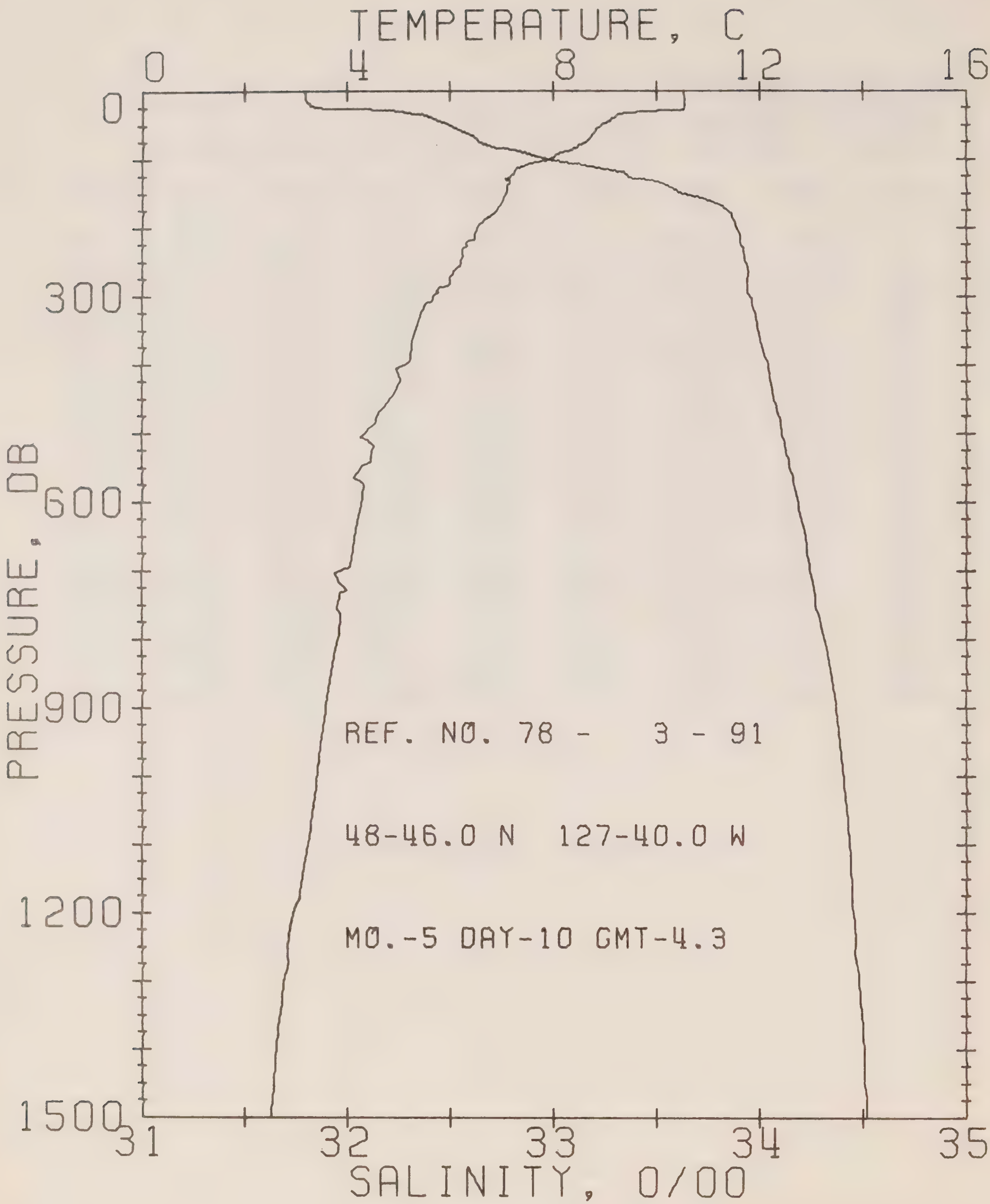
OFFSHCRE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 89 DATE 9/ 5/78 STATION 6
POSITION 49- 2.0N, 130-40.0W GMT 17.3
RESULTS OF STP CAST 194 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	9.96	32.50	0	25.03	293.6	0.0	0.0	1487.
10	9.96	32.49	10	25.02	294.7	0.29	0.02	1487.
20	9.95	32.49	20	25.03	294.6	0.59	0.06	1487.
30	9.95	32.51	30	25.04	293.8	0.88	0.14	1487.
50	8.77	32.61	50	25.31	268.0	1.44	0.36	1484.
75	7.96	32.95	75	25.69	232.0	2.07	0.76	1481.
100	7.43	33.30	99	26.05	199.0	2.61	1.24	1480.
125	7.35	33.71	124	26.38	167.9	3.06	1.76	1481.
150	7.19	33.81	149	26.48	158.2	3.47	2.33	1481.
175	6.94	33.90	174	26.59	148.6	3.85	2.96	1480.
200	6.74	33.94	199	26.64	143.6	4.22	3.66	1480.
225	6.43	33.91	223	26.66	142.1	4.57	4.43	1479.
250	5.70	33.88	248	26.73	135.6	4.92	5.27	1476.
300	5.12	33.88	298	26.80	129.3	5.59	7.13	1475.
400	4.94	34.02	397	26.93	117.6	6.81	11.48	1476.
500	4.44	34.08	496	27.04	108.3	7.93	16.65	1476.
600	3.90	34.13	595	27.13	99.6	8.97	22.46	1475.
800	3.51	34.27	793	27.28	86.8	10.82	35.60	1477.
1000	3.27	34.38	990	27.39	76.7	12.46	50.57	1479.
1200	3.05	34.45	1188	27.47	70.8	13.92	66.94	1482.
1500	2.52	34.52	1484	27.57	61.3	15.88	93.94	1485.


TEMPERATURE, C
0
4
8
12
16
PRESSURE, DB
0
300
600
900
1200
1500
REF. NØ. 78 - 3 - 90
48-51.0 N 128-40.0 W
MØ.-5 DAY-10 GMT-0.4
31
32
33
34
35
SALINITY, 0/00

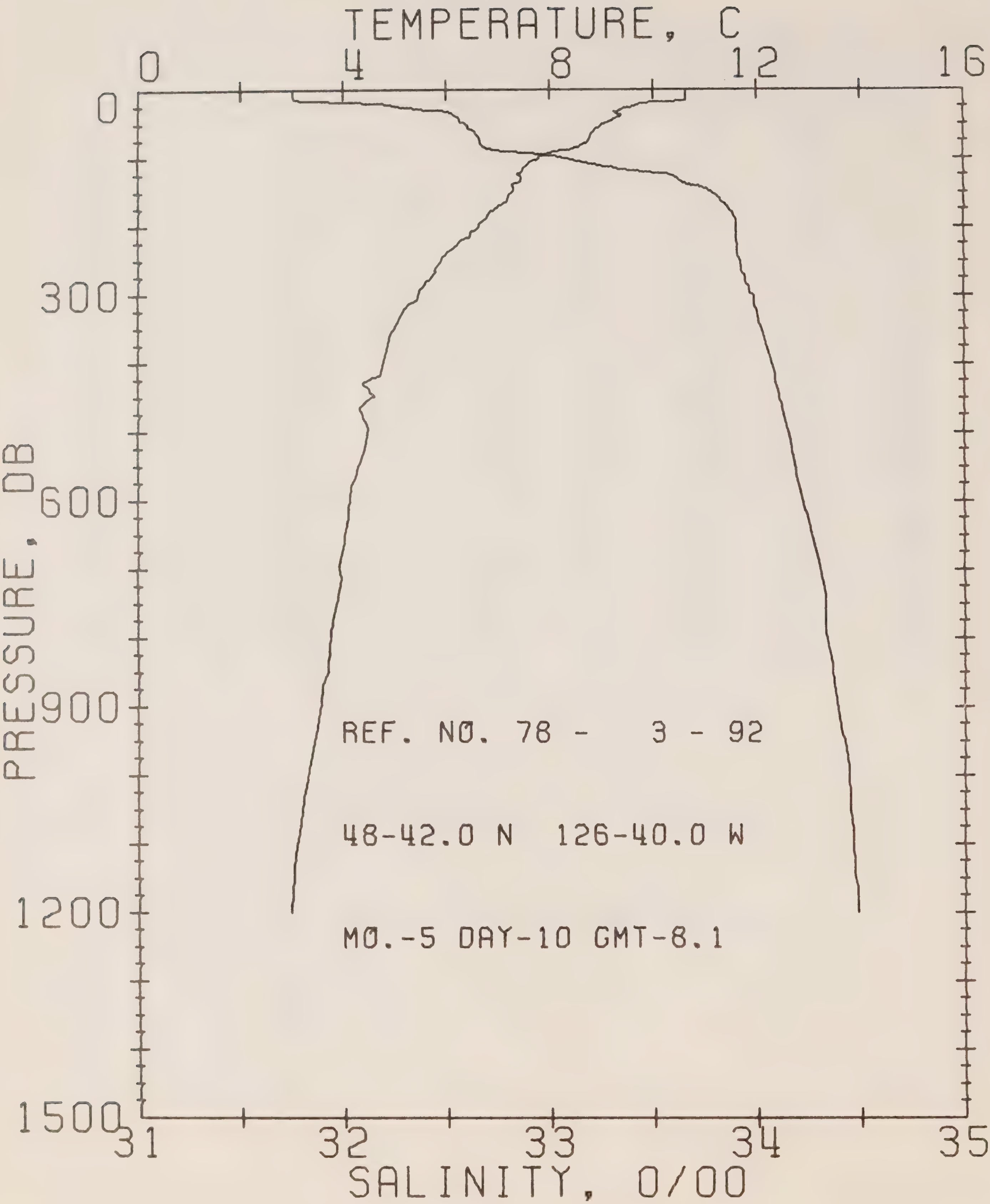
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 90 DATE 10/ 5/78 STATION 5
POSITION 48-51.0N, 128-40.0W GMT 0.4
RESULTS OF STP CAST 193 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	10.18	32.13	0	24.71	324.5	0.0	0.0	1487.
10	10.18	32.14	10	24.72	324.2	0.32	0.02	1488.
20	10.26	32.43	20	24.93	304.1	0.63	0.06	1488.
30	9.85	32.48	30	25.03	294.2	0.93	0.14	1487.
50	8.93	32.61	50	25.29	270.4	1.50	0.37	1484.
75	8.49	32.70	75	25.42	257.9	2.16	0.79	1483.
100	7.38	32.99	99	25.81	221.4	2.77	1.33	1480.
125	6.86	33.53	124	26.30	174.7	3.26	1.89	1479.
150	7.00	33.71	149	26.43	163.4	3.68	2.48	1480.
175	6.78	33.82	174	26.55	152.6	4.07	3.13	1479.
200	6.70	33.87	199	26.60	148.1	4.45	3.85	1480.
225	6.29	33.91	223	26.68	140.3	4.81	4.63	1478.
250	5.95	33.93	248	26.74	134.9	5.15	5.46	1478.
300	5.48	33.95	298	26.81	128.3	5.81	7.30	1476.
400	4.88	34.04	397	26.95	115.4	7.03	11.64	1476.
500	4.50	34.12	496	27.06	106.5	8.14	16.72	1476.
600	4.23	34.19	595	27.15	98.6	9.16	22.45	1477.
800	3.60	34.32	793	27.31	84.1	10.98	35.40	1477.
1000	3.34	34.42	991	27.42	74.7	12.57	49.93	1480.
1200	2.96	34.49	1188	27.50	67.1	13.98	65.77	1481.
1500	2.50	34.55	1484	27.59	58.8	15.87	91.60	1485.


TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
31
32
33
34
35
SALINITY, 0/00
REF. NO. 78 - 3 - 91
48-46.0 N 127-40.0 W
MO.-5 DAY-10 GMT-4.3

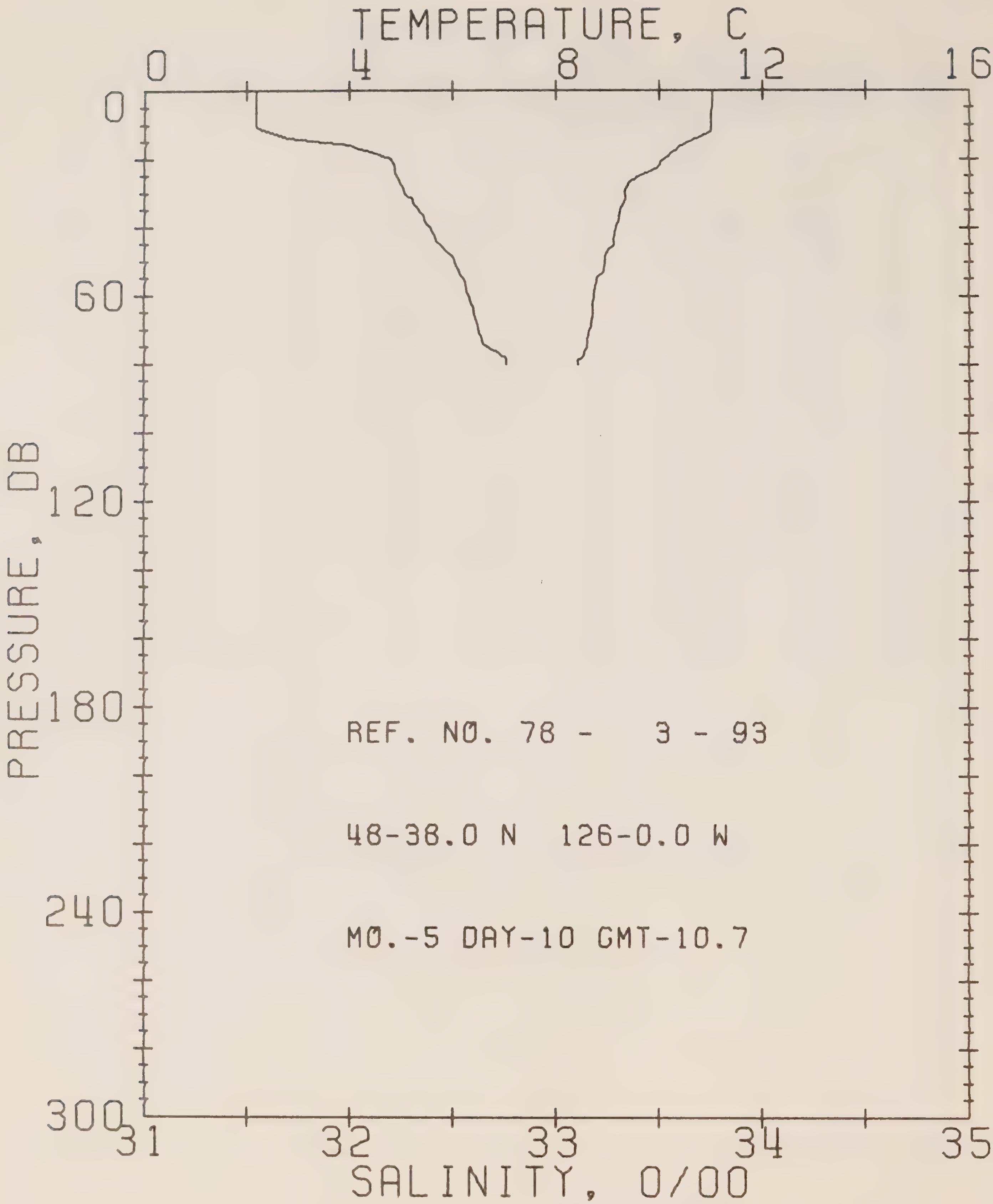
OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 91 DATE 10/ 5/78 STATION 4
POSITION 48-46.0N. 127-40.0W GMT 4.3
RESULTS OF STP CAST 191 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	10.54	31.79	0	24.38	355.5	0.0	0.0	1488.
10	10.55	31.80	10	24.39	355.3	0.36	0.02	1488.
20	10.55	31.82	20	24.40	354.3	0.71	0.07	1489.
30	10.02	32.23	30	24.82	315.0	1.05	0.16	1487.
50	8.95	32.49	50	25.19	279.7	1.63	0.39	1484.
75	8.62	32.64	75	25.36	264.0	2.31	0.83	1483.
100	7.92	32.98	99	25.72	229.6	2.93	1.38	1482.
125	7.17	33.36	124	26.13	191.4	3.45	1.97	1480.
150	7.07	33.62	149	26.35	170.7	3.89	2.59	1480.
175	6.90	33.85	174	26.55	152.4	4.29	3.25	1480.
200	6.54	33.89	199	26.63	145.1	4.66	3.96	1479.
225	6.32	33.91	223	26.67	140.8	5.02	4.73	1479.
250	6.21	33.93	248	26.71	138.2	5.37	5.57	1479.
300	5.67	33.95	298	26.79	130.6	6.04	7.46	1477.
400	5.13	34.04	397	26.92	118.6	7.28	11.88	1477.
500	4.34	34.11	496	27.07	105.4	8.41	17.03	1475.
600	4.28	34.19	595	27.13	99.8	9.44	22.80	1477.
800	3.81	34.31	793	27.28	86.8	11.30	36.04	1478.
1000	3.41	34.41	991	27.40	76.8	12.92	50.89	1480.
1200	2.94	34.45	1188	27.48	69.3	14.39	67.29	1481.
1500	2.50	34.52	1484	27.57	61.0	16.32	93.88	1484.


TEMPERATURE, C
0
4
8
12
16
0
300
600
900
1200
1500
PRESSURE, DB
REF. NO. 78 - 3 - 92
48-42.0 N 126-40.0 W
MO.-5 DAY-10 GMT-8.1
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 92 DATE 10/ 5/78 STATION 3
POSITION 48-42.0N, 126-40.0W GMT 8.1
RESULTS OF STP CAST 175 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	10.64	31.75	0	24.34	360.0	0.0	0.0	1489.
10	10.63	31.75	10	24.34	360.3	0.36	0.02	1489.
20	9.77	32.18	20	24.81	314.9	0.71	0.07	1486.
30	9.39	32.39	30	25.04	293.6	1.02	0.15	1485.
50	9.07	32.59	50	25.24	274.7	1.58	0.38	1485.
75	8.73	32.66	75	25.35	264.6	2.25	0.80	1484.
100	7.80	33.06	99	25.80	222.0	2.87	1.36	1481.
125	7.41	33.59	124	26.27	177.8	3.37	1.93	1481.
150	7.27	33.78	149	26.45	161.5	3.80	2.53	1481.
175	6.90	33.87	174	26.57	150.6	4.19	3.17	1480.
200	6.61	33.90	199	26.63	144.9	4.56	3.88	1479.
225	6.22	33.90	223	26.68	140.0	4.92	4.65	1478.
250	5.90	33.92	248	26.73	135.2	5.26	5.48	1477.
300	5.44	33.99	298	26.85	124.8	5.91	7.31	1476.
400	4.75	34.07	397	26.99	112.0	7.09	11.50	1475.
500	4.46	34.15	496	27.09	103.6	8.16	16.38	1476.
600	4.10	34.22	595	27.18	95.3	9.15	21.95	1476.
800	3.72	34.33	793	27.31	84.1	10.92	34.55	1478.
1000	3.29	34.44	991	27.44	72.9	12.49	48.95	1479.
1200	2.97	34.48	1188	27.50	67.7	13.89	64.57	1481.


TEMPERATURE, C
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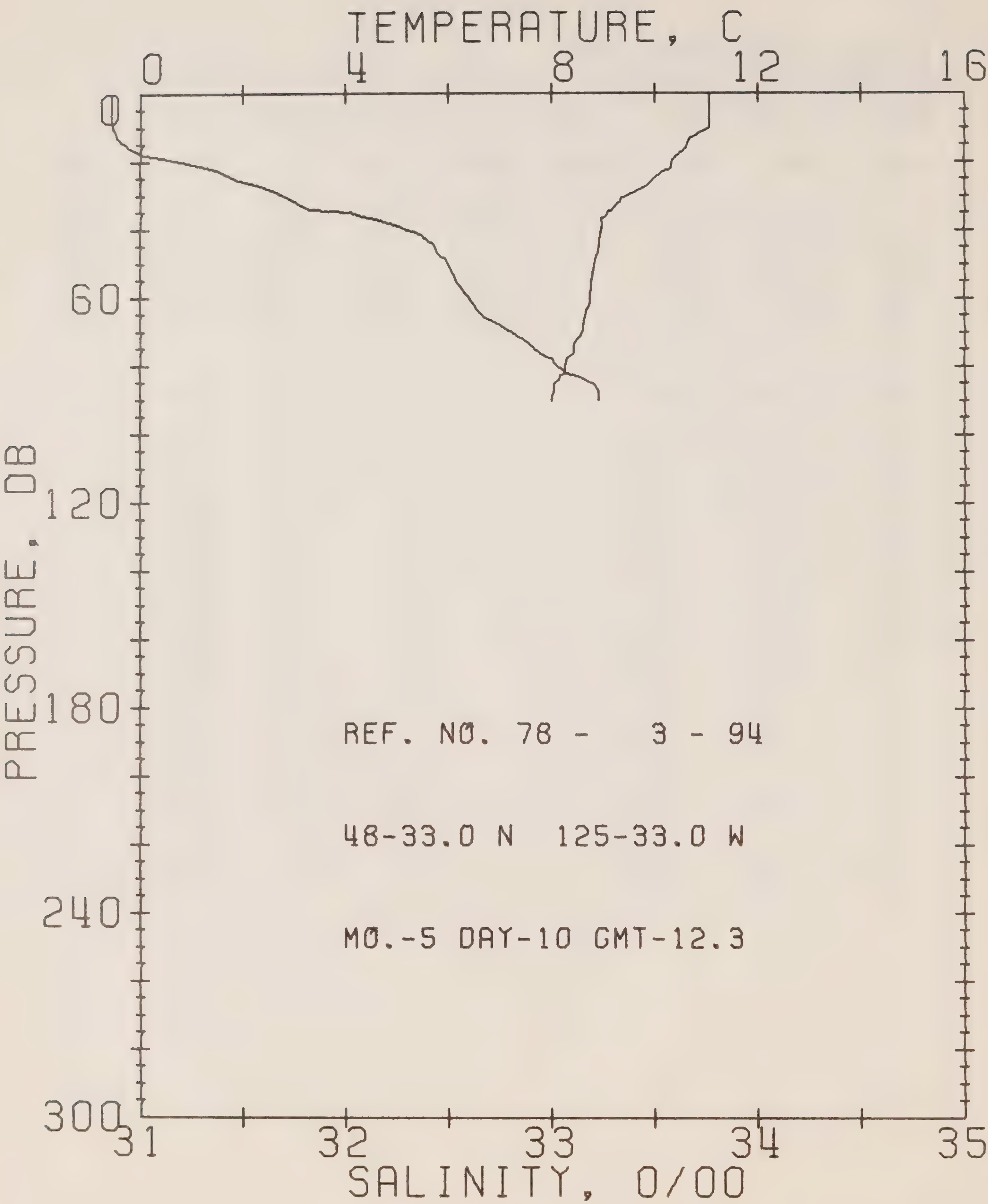
4
8
12
16
0
60
120
180
240
300
PRESSURE, DB
REF. NO. 78 - 3 - 93
48-38.0 N 126-0.0 W
MO.-5 DAY-10 GMT-10.7
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 93 DATE 10/ 5/78 STATION 2
POSITION 48-38.0N, 126- 0.0W GMT 10.7
RESULTS OF STP CAST 41 POINTS TAKEN FROM ANALOG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	11.03	31.55	0	24.11	381.3	0.0	0.0	1490.
10	11.01	31.55	10	24.11	381.4	0.38	0.02	1490.
20	10.10	32.20	20	24.78	318.6	0.73	0.07	1487.
30	9.34	32.27	30	24.95	301.8	1.04	0.15	1485.
50	8.95	32.51	50	25.20	278.5	1.62	0.39	1484.
75	8.60	32.68	75	25.39	261.1	2.30	0.82	1483.

DEPTH	TEMP	SAL	DEPTH	TEMP	SAL
0.	11.03	31.55	40.	9.16	32.39
4.	11.03	31.55	44.	9.13	32.42
8.	11.02	31.55	45.	9.12	32.44
9.	11.02	31.55	47.	9.02	32.47
11.	11.01	31.55	49.	8.97	32.50
12.	11.01	31.60	50.	8.95	32.51
14.	10.73	31.70	53.	8.92	32.53
16.	10.44	32.01	55.	8.81	32.55
17.	10.37	32.03	56.	8.79	32.56
18.	10.26	32.11	59.	8.74	32.57
20.	10.10	32.20	64.	8.71	32.60
23.	9.94	32.22	65.	8.71	32.60
24.	9.75	32.22	69.	8.70	32.62
25.	9.57	32.23	71.	8.65	32.63
27.	9.43	32.24	74.	8.60	32.65
30.	9.34	32.27	75.	8.60	32.68
32.	9.36	32.31	77.	8.56	32.73
33.	9.34	32.31	78.	8.50	32.75
34.	9.29	32.32	79.	8.44	32.76
37.	9.23	32.36	80.	8.43	32.76
38.	9.22	32.36			


TEMPERATURE, C
0
4
8
12
16
0
60
120
180
240
300
PRESSURE, DB
REF. NO. 78 - 3 - 94
48-33.0 N 125-33.0 W
MO.-5 DAY-10 GMT-12.3
31
32
33
34
35
SALINITY, 0/00

OFFSHORE OCEANOGRAPHY GROUP
REFERENCE NO. 78- 3- 94 DATE 10/ 5/7P STATION 1
POSITION 48-33.0N, 125-33.0W GMT 12.3
RESULTS OF STP CAST 49 POINTS TAKEN FROM ANALCG TRACE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	11.07	30.86	0	23.57	433.0	0.0	0.0	1489.
10	11.06	30.87	10	23.58	432.5	0.43	0.02	1489.
20	10.35	31.20	20	23.96	396.7	0.85	0.09	1487.
30	9.47	31.69	30	24.48	346.5	1.22	0.18	1485.
50	8.85	32.49	50	25.21	278.2	1.83	0.42	1484.
75	8.43	32.92	75	25.60	240.8	2.49	0.84	1483.

DEPTH	TEMP	SAL
0.	11.07	30.86
4.	11.07	30.86
7.	11.07	30.86
8.	11.07	30.86
10.	11.06	30.87
12.	10.82	30.88
13.	10.73	30.89
16.	10.60	30.95
18.	10.45	31.02
19.	10.40	31.11
20.	10.35	31.20
22.	10.32	31.35
23.	10.15	31.39
25.	9.97	31.46
27.	9.86	31.57
29.	9.59	31.66
31.	9.36	31.73
32.	9.31	31.76
34.	9.17	31.83
35.	9.08	32.02
36.	9.03	32.08
37.	8.97	32.15
39.	8.98	32.25
40.	8.99	32.30
41.	8.95	32.35

DEPTH	TEMP	SAL
44.	8.93	32.42
47.	8.91	32.45
49.	8.86	32.49
51.	8.84	32.50
56.	8.78	32.55
61.	8.75	32.61
62.	8.75	32.62
64.	8.67	32.65
65.	8.66	32.67
68.	8.62	32.75
70.	8.60	32.81
72.	8.51	32.86
73.	8.48	32.88
74.	8.43	32.90
76.	8.43	32.94
78.	8.30	33.01
79.	8.28	33.01
82.	8.25	33.07
83.	8.17	33.13
84.	8.13	33.16
85.	8.05	33.21
88.	8.04	33.23
89.	8.02	33.23
90.	8.01	33.23

Surface Salinity and Temperature Observations

(P-78-3)

SURFACE SALINITY AND TEMPERATURE OBSERVATIONS
CRUISE REFERENCE NUMBER 78- 3

DATE/TIME YR	MO	DY	GMT	SALINITY 0/00	TEMP C	LONGITUDE WEST
78	3	24	1745	30.967		123-30
78	3	24	1840	30.861		124- 0
78	3	24	2010	30.824		124-30
78	3	24	2145	31.472		125- 0
78	3	24	2310	32.245	9.1	125-30
78	3	25	45	32.302	9.6	126- 0
78	3	25	245	32.390	9.3	126-40
78	3	25	545	32.492	9.4	127-40
78	3	25	840	32.500	8.6	128-40
78	3	25	1120	32.588	8.6	129-40
78	3	25	1405	32.553	8.3	130-40
78	3	25	1700	32.508	8.1	131-40
78	3	25	2010	32.539	8.0	132-40
78	3	25	2255	32.554	7.7	133-40
78	3	26	145	32.552	7.2	134-40
78	3	26	430	32.534	7.1	135-40
78	3	26	710	32.529	7.2	136-40
78	3	26	1055	32.531	7.1	137-40
78	3	26	1340	32.586	7.1	138-40
78	3	26	1620	32.707	7.0	139-40
78	3	26	2000	32.782	5.9	140-40
78	3	27	200	32.770	5.9	141-40
78	3	27	540	32.765	5.9	142-40
78	3	27	1035	32.806	5.4	143-40
78	3	28	0	32.844	5.4	ON STATION
78	3	29	0	32.838	5.4	ON STATION
78	3	30	0	32.846	5.4	ON STATION
78	3	31	0	32.813	5.4	ON STATION
78	4	1	0	32.814	5.6	ON STATION
78	4	2	0	32.839	5.4	ON STATION
78	4	3	0	32.834	5.4	ON STATION
78	4	4	0	32.839	5.5	ON STATION
78	4	5	0	32.822	5.3	ON STATION
78	4	6	0	32.827	5.2	ON STATION
78	4	7	0	32.855	5.4	ON STATION
78	4	8	0	32.840	5.4	ON STATION
78	4	9	0	32.844	5.5	ON STATION
78	4	10	0	32.818	5.3	ON STATION
78	4	11	0	32.799	5.5	ON STATION
78	4	12	0	32.824	5.5	ON STATION
78	4	13	0	32.831	5.5	ON STATION
78	4	14	0	32.840	5.5	ON STATION
78	4	15	0	32.827	5.6	ON STATION
78	4	16	0	32.825	5.6	ON STATION

SURFACE SALINITY AND TEMPERATURE OBSERVATIONS
CRUISE REFERENCE NUMBER 78- 3

DATE/TIME				SALINITY	TEMP	LONGITUDE
YR	MO	DY	GMT	0/00	C	WEST
78	4	17	0	32.820	5.3	ON STATION
78	4	18	0	32.844	5.6	ON STATION
78	4	19	0	32.807	5.7	ON STATION
78	4	20	0	32.811	5.8	ON STATION
78	4	21	0	32.843	5.7	ON STATION
78	4	22	0	32.809	5.7	ON STATION
78	4	23	0	32.846	6.1	ON STATION
78	4	24	0	32.811	6.1	ON STATION
78	4	25	0	32.817	7.0	ON STATION
78	4	26	0	32.816	6.0	ON STATION
78	4	27	0	32.812	6.1	ON STATION
78	4	28	0	32.811	6.1	ON STATION
78	4	29	0	32.799	5.9	ON STATION
78	4	30	0	32.807	5.9	ON STATION
78	5	1	0	32.794	5.7	ON STATION
78	5	2	0	32.818	5.7	ON STATION
78	5	3	0	32.825	5.8	ON STATION
78	5	4	0	32.822	5.9	ON STATION
78	5	5	0	32.812	5.8	ON STATION
78	5	6	0	32.816	5.9	ON STATION
78	5	7	0	32.804	6.0	ON STATION
78	5	7	1715	32.821	6.1	143-40
78	5	7	2045	32.740	6.6	142-40
78	5	8	230	32.771	6.7	141-40
78	5	8	530	32.801	7.1	140-40
78	5	8	900	32.643	7.7	139-40
78	5	8	1145	32.721	7.5	138-40
78	5	8	1520	32.557	8.1	137-40
78	5	8	1810	32.600	8.3	136-40
78	5	8	2340	32.550	8.5	135-40
78	5	9	300	32.512	8.6	134-40
78	5	9	700	32.523	8.9	133-40
78	5	9	950	32.450	9.2	132-40
78	5	9	1400	32.495	9.4	131-40
78	5	9	1720	32.480	10.0	130-40
78	5	9	2115	32.452	10.2	129-40
78	5	10	25	32.247	10.2	128-40
78	5	10	420	32.063	10.5	127-40
78	5	10	805	31.853	10.6	126-40
78	5	10	1040	31.629	11.0	126- 0
78	5	10	1220	31.468	11.1	125-33
78	5	10	1430	31.136		125- 0
78	5	10	1800	31.514		124- 0

b DENOTES SALINITY SAMPLE TAKEN FROM A BUCKET. ALL OTHER SAMPLES TAKEN FROM THE SEAWATER LOOP

LIST OF OMISSIONS FROM DATA

Hydrographic Data:

Consec. #	Depth (m)	T	S	O_2	Notes 1	Notes 2	Notes 3	Comments
4	51		*					no sample
7	1416	*						no reading
22	4106		*		*			
	4106			*	*			
43	549		*			*		
	549			*		*		
	969		*					no sample
59	1484		*					bottle not sealed.
	1484			*				
73	97		*					no sample
	97			*				
	1490	*						no reading
	4202		*		*			

Notes (MacNeill, 1977):

1. The data is suspect because of a reversal of gradient by >.01 $^{o}/oo$ (salinity) or >.08 ml/ℓ (oxygen).
2. The data is deleted because of very irregular data values (usually a mis-tripping or leaking bottle if both oxygen and salinity are irregular).
3. The data is deleted because duplicate samples at a depth were not within .01 $^{o}/oo$ (salinity) or .08 ml/ℓ (oxygen).

STD Data:

no omissions

Note: Consecutive numbers 15 to 19, 37 to 41 and 61 to 65 are STD's taken as part of the MILE program and not included in this report.

Pacific Marine Science Report 78-21

A STUDY OF WIND AND ATMOSPHERIC PRESSURE IN EASTERN PARRY CHANNEL, N.W.T. - SUMMER, 1977

by

S.H. Hill ,

D.B. Fissel and H. Serson

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Sidney, B.C.

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[2] Arctic Sciences Ltd., Sidney, B.C.
[3] Defence Research Establishment Pacific, Esquimalt,B.C.

Pacific Marine Science Report 78-21

A STUDY OF WIND AND ATMOSPHERIC PRESSURE IN EASTERN PARRY CHANNEL, N.W.T. - SUMMER, 1977

by

S.H. Hill[1], D.B. Fissel[2] and H. Serson[3]

Institute of Ocean Sciences, Patricia Bay
Sidney, B.C.

1978

This is a manuscript which has received only limited circulation. On citing this report in a bibliography, the title should be followed by the words "UNPUBLISHED MANUSCRIPT" which is in accordance with accepted bibliographic custom.

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ABSTRACT

Wind and air pressure data collected in eastern Parry Channel during the summer of 1977 are presented. Winds, as measured at the AES station at Resolute are found to differ significantly from simultaneous speed and direction measurements at other stations in the region, although correlation coefficients increase as the distance from Resolute decreases. Easterly wind components throughout the region show a better correlation with Resolute than do northerly wind components. A good correlation ($r^2 = 0.76$ - with limited data of 9 days duration) is found between calculated geostrophic winds and measured winds at two stations in Barrow Strait.

1. INTRODUCTION

In the summer of 1977, self-recording wind and air pressure gauges were operated at various coastal locations around Barrow Strait and Lancaster Sound, over periods of up to 45 days. The wind measurements were used in other field programs of the Institute of Ocean Sciences, Patricia Bay, Arctic Marine Science Group : a Study of the Surface Currents of Eastern Parry Channel (Fissel and Marko, 1978), a Study of Sea-Ice Movements in Northern Barrow Strait (McNeill et al, 1978) and a Study of Sub-surface Currents in Eastern Lancaster Sound (Fissel and Wilton, 1978).

In this report, we present all of the wind and air pressure data collected in the various field programs. Using this data, the spatial variability of the wind-field over the eastern Parry Channel region is described. In particular, the winds measured at the permanent Atmospheric Environment Service weather station at Resolute, N.W.T., are compared with the winds observed at other sites to test the applicability of the Resolute wind measurements to other locations in this region. From the air pressure data, the geostrophic wind is computed and compared to the observed surface wind. The wind and air pressure values also provide a data base for the testing and calibration of a numerical model of the wind field of Barrow Strait currently being developed under contract to the Department of National Defence, Defence Research Establishment Pacific [Danard (1977)].

2. REVIEW

There have been few published works concerning the meteorology of the eastern Parry Channel region. Walker (1977) reviewed the meteorology of the Arctic Archipelago in general. Duck et al (1977) conducted a study of weather and weather-related factors in the Lancaster Sound area (79°W long. to 89°W long.) which might affect offshore drilling. The study was based on data from the Atmospheric Environment Service's station at Resolute, N.W.T., and on a limited number of ship observations. Although this study was mainly concerned with predicting extreme values of various parameters, part of the data includes wind roses and frequency tables of wind-speed classes for Resolute (July - October), and Lancaster Sound (August and September). These indicate that the average wind speed and direction are much the same in Lancaster Sound as in Resolute, although there is a smaller percentage of North (N) winds and a greater percentage of East (E) and West (W) winds in Lancaster Sound than in Resolute.

Conway (1976) investigated the applicability of Resolute wind data to the entire Barrow Strait region based on previous investigations, data collected from Polar Continental Shelf Project summer camps, and on comparisons of upper air movements (gradient level - assumed to be 650 m or 900 mbar) at Resolute to surface air movements. Some conclusions of this study were:

(1) Ratios of surface wind-speed to gradient-level wind-speed are often greater than 1, and are dependent on gradient-level wind-speed and direction.

(2) Southwest (SW) gradient-level winds ate strongly distorted, typically becoming South (S) or Southeast (SE) at the surface. South winds are also distorted, becoming SE at the surface. Surface winds closely follow gradient-level winds from the N or SE directions.

(3) Ship reports for the period 1947 - 1951, compared to data from Resolute during the same period, indicate that wind-speeds over Barrow Strait and Lancaster Sound are typically higher than those in Resolute.

Danard (1977) developed a mathematical model to predict mesoscale (10 km grid) effects of topography on surface winds in Barrow Strait, based on upper air measurements and Resolute surface temperatures. Results of these predictions indicate that differences between Resolute winds and computed surface winds are large in some areas of Barrow Strait, notably on the northern shore of Somerset Island and over offshore areas directly south of Devon Island.

3. DATA COLLECTION AND ANALYSIS

3.1 Station Locations

Three self-recording anemometers and four self-recording air pressure gauges were installed at the locations shown in Figure 1 [W1 (Somerville Island), WP3 (Cape Anne), WP4 (Rodd Bay), P5 (Cape Hurd), and P6 (Cape York)],in early July, 1977. The sites were revisited on August 20 to change the data tapes and films, and were finally removed on August 31 (see Figure 2). Similar measurements, recorded for use in complementary programs, were made by McNeill et al (1978) at Griffith Island (W2), and Lea (1977) at Cape Charles Yorke (WP7) in Lancaster Sound.

The station sites were chosen to provide simultaneous measurements of wind and pressure around the periphery of Barrow Strait and Lancaster Sound. In selecting the wind measurement stations, sites were chosen so as to minimize the influence of the local topography on the wind-field. Many sections of the coastline are mountainous, making a suitable site difficult to find, e.g. on the rugged terain of the southern Devon Island coast, no adequate anemometer location could be found. Even at the locations where anemometers were established, the local topography, as shown in Figure 3, may significantly alter the wind-field for some wind directions. In comparisons of the wind measurements in section 4, the topographic effects will be discussed.

3.2 Instrument Description

The anemometers used in this study were of two types : the Braincon Histogram anemometer at stations 1, 3 and 4, and the Aanderaa self-recording anemometer at stations 2 and 7. The Braincon instrument employs a 3-cup rotor speed sensor with a direction vane referenced to the fixed instrument orientation. During 14.375 minute time exposures (one every fifteen minutes), a photographic record is made of the speed and direction

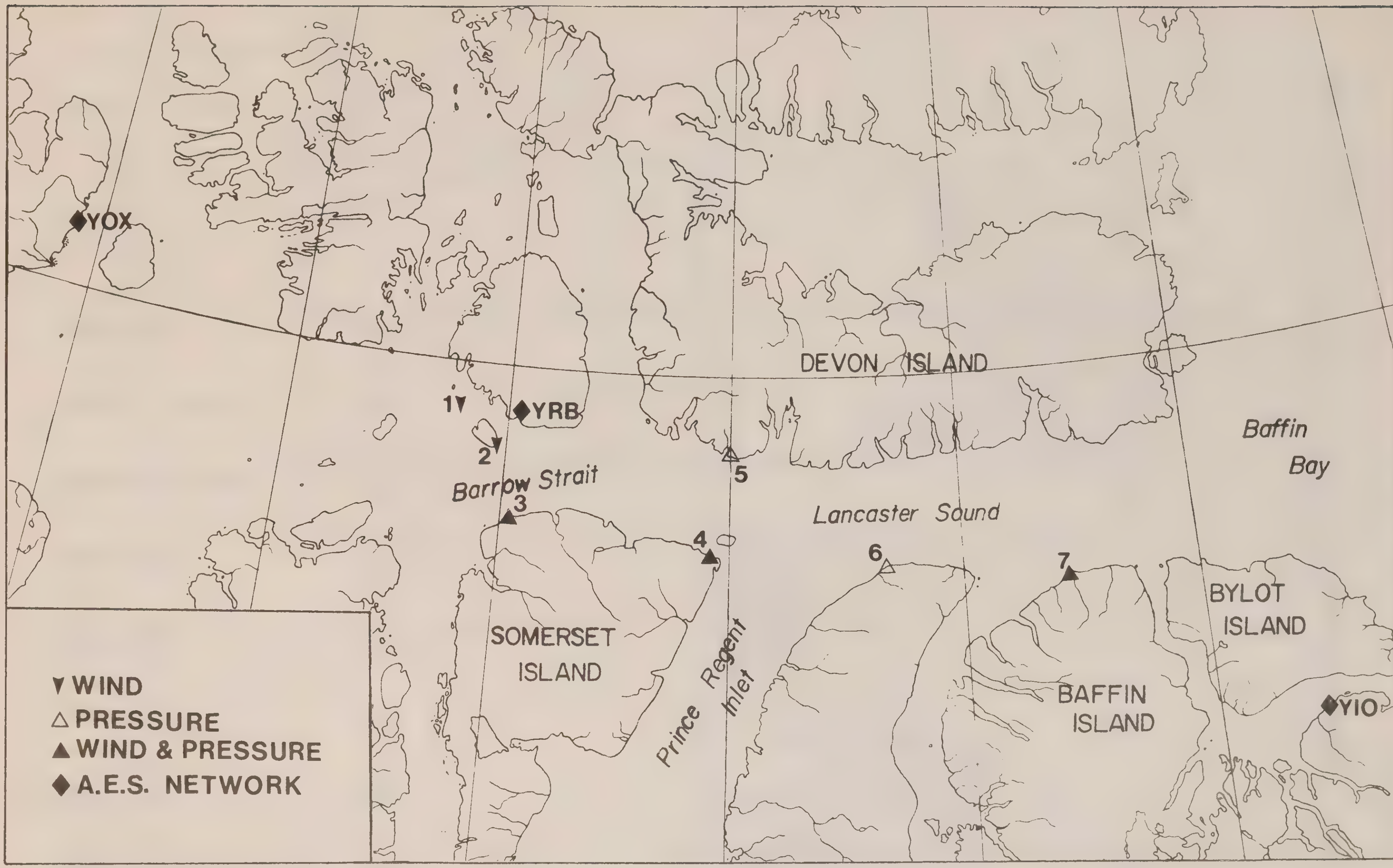


Figure 1. Eastern Parry Channel region showing the locations of weather recording stations.

Fig. 2 DATA COLLECTION PERIODS.

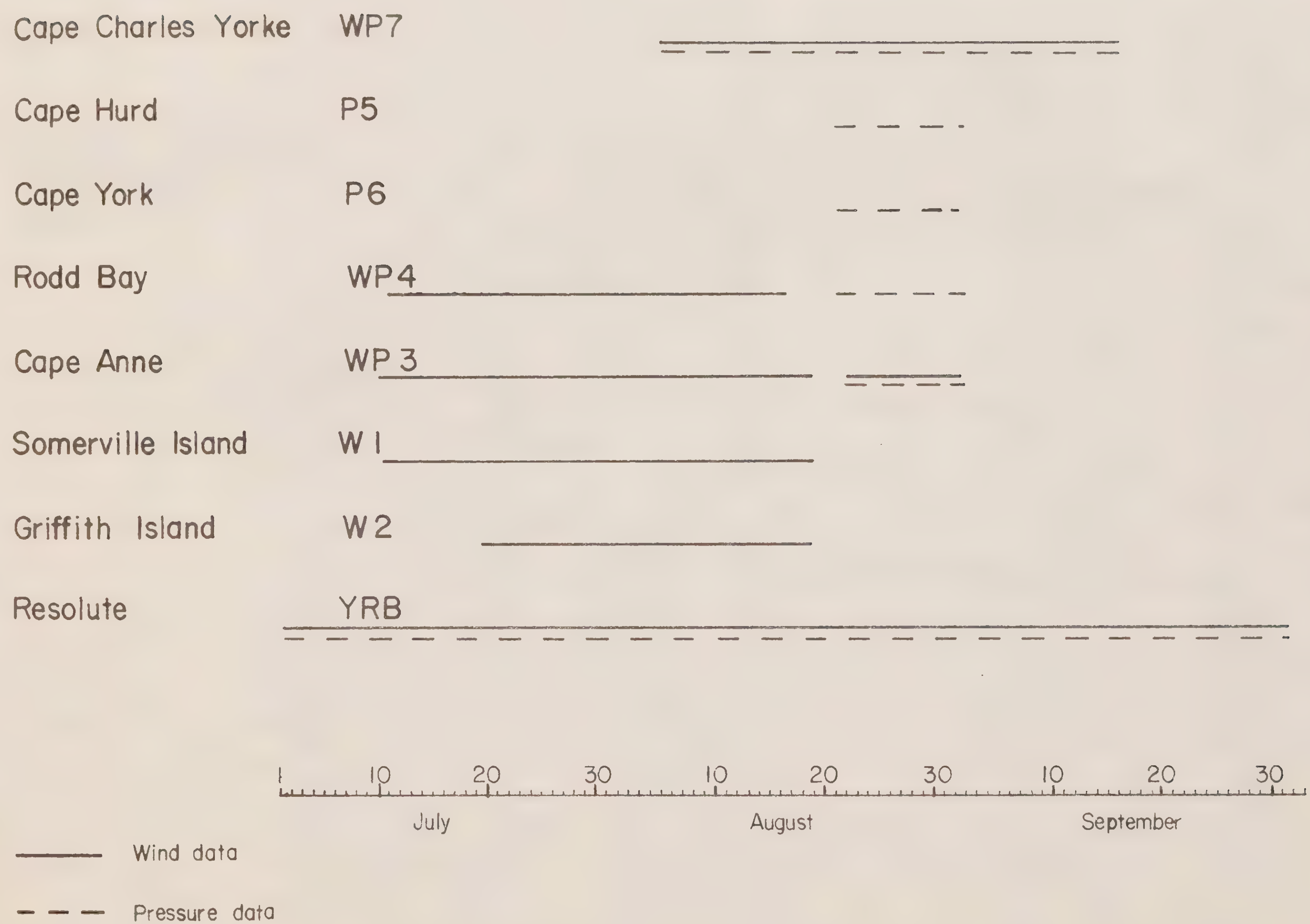


Figure 3. Topography in the vicinity of weather recording stations. Contour intervals are 100 feet.

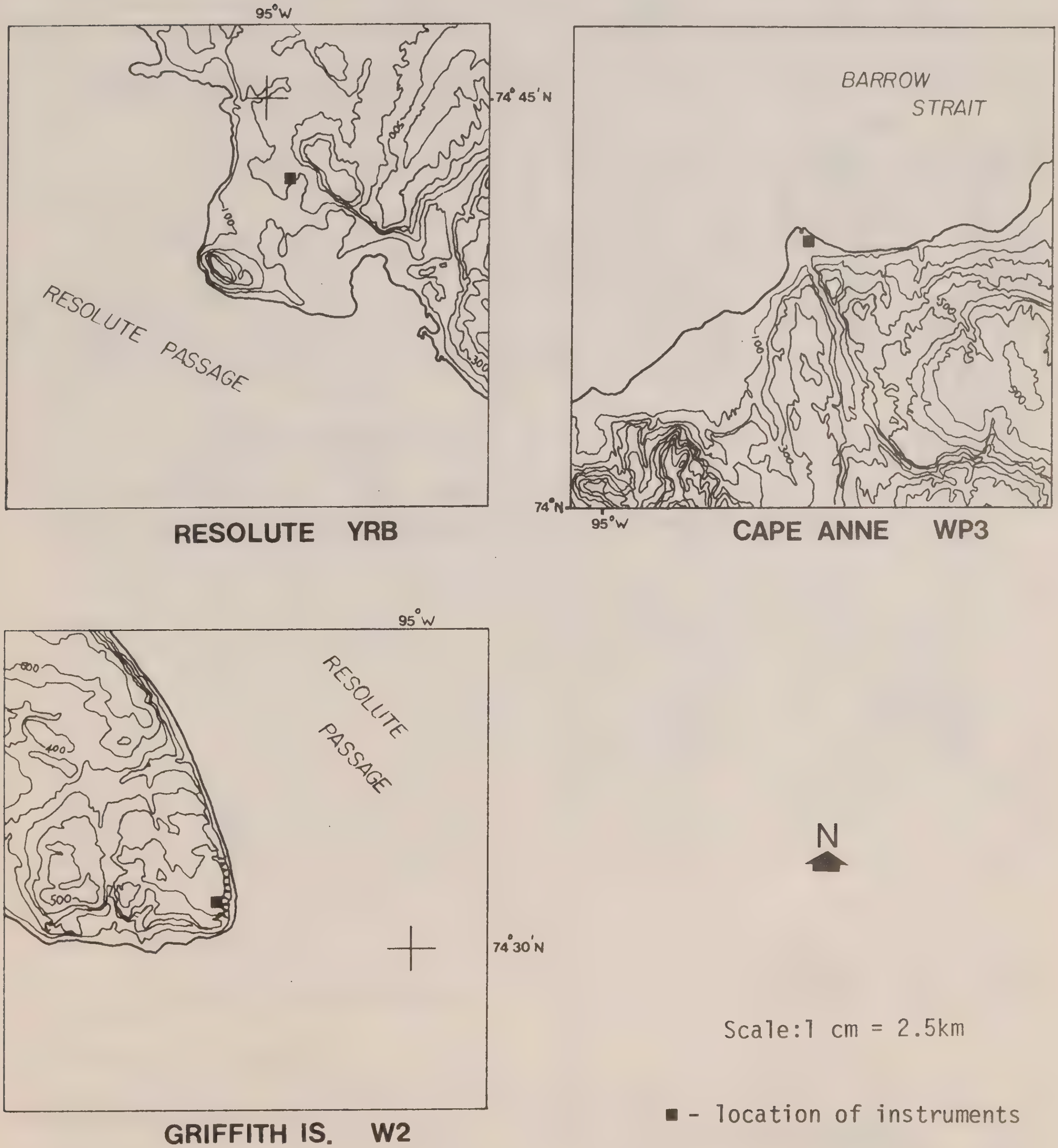
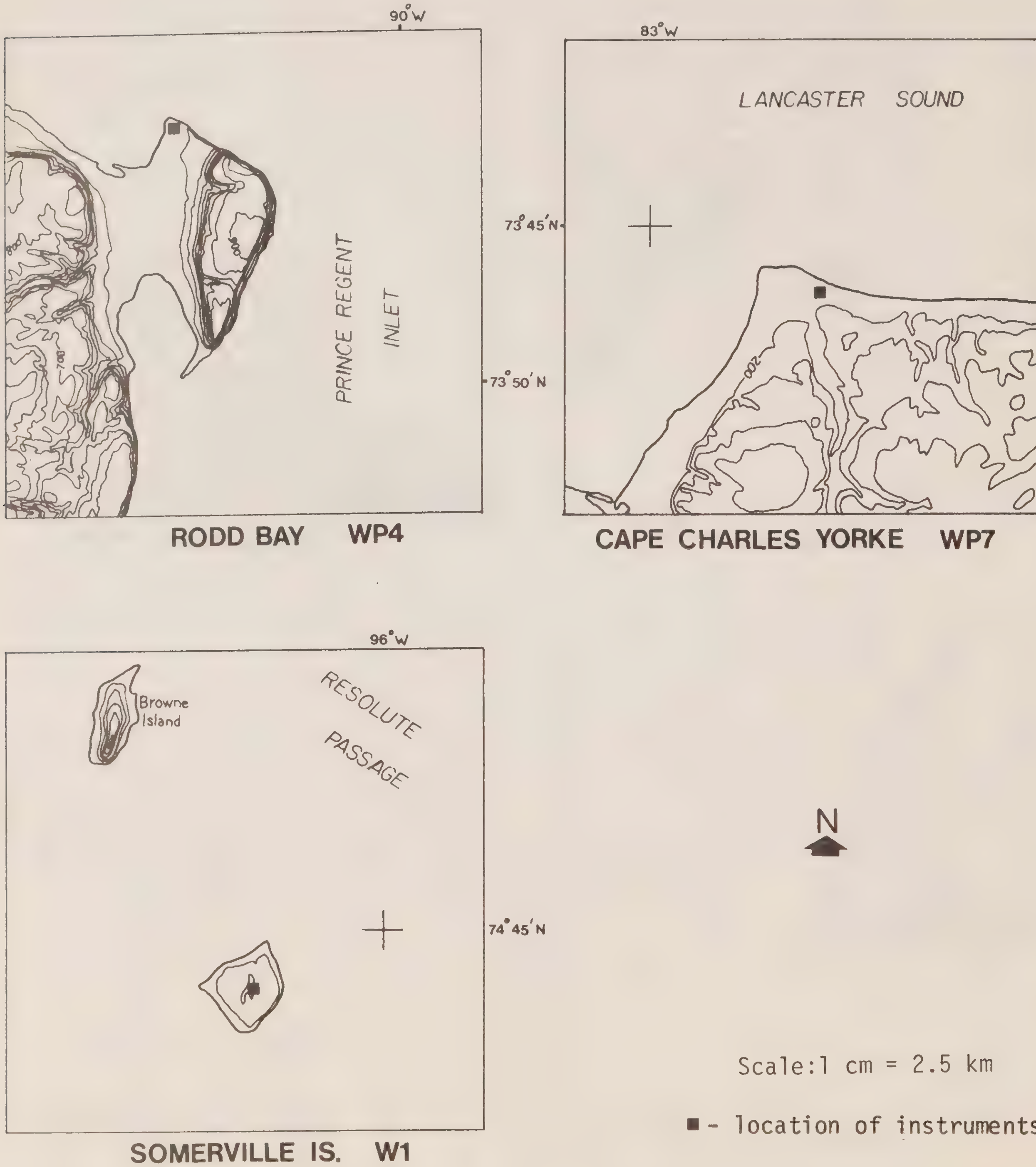


Figure 3 (Cont'd) Topography in the vicinity of weather recording stations. Contour intervals are 100 feet (except for Cape Charles Yorke, where intervals are 200 feet).



data using two radioactive sources exposed to the film. The speed information is read as the length of an arc on the film caused by the rotor-driven movement of one radioactive source, while the direction information is taken as the mean angle of the direction arc made by the other radioactive source on each exposed frame of film. Because of weak radioactive sources used in the instrument, the speed and direction accuracies were less than optimal; the accuracy of the speed arc measurements from the film are estimated at ± 5 degrees or ±10 percent, whichever is greater, corresponding to a minimum speed uncertainty of ± 0.6 m/sec. Inaccuracies of instrument calibration and functioning will add to this.

In the Aanderaa anemometer, the speed measurement is via a 3-cup rotor, while the wind direction is measured by means of a vane oriented to the fixed heading of the instrument. The data was recorded in digital form on ¼-inch magnetic tape. The averaging period and sampling interval are the same in these instruments. A 30-minute sampling interval was used at both stations 2 and 7. The accuracy of the wind data, according to the manufacturer, is ± 2% of the speed, and better than ± 5° in direction. The threshold speed of the speed sensor is 0.3 - 0.5 m/s, while the direction sensor responds at speeds of at least 0.3 m/s.

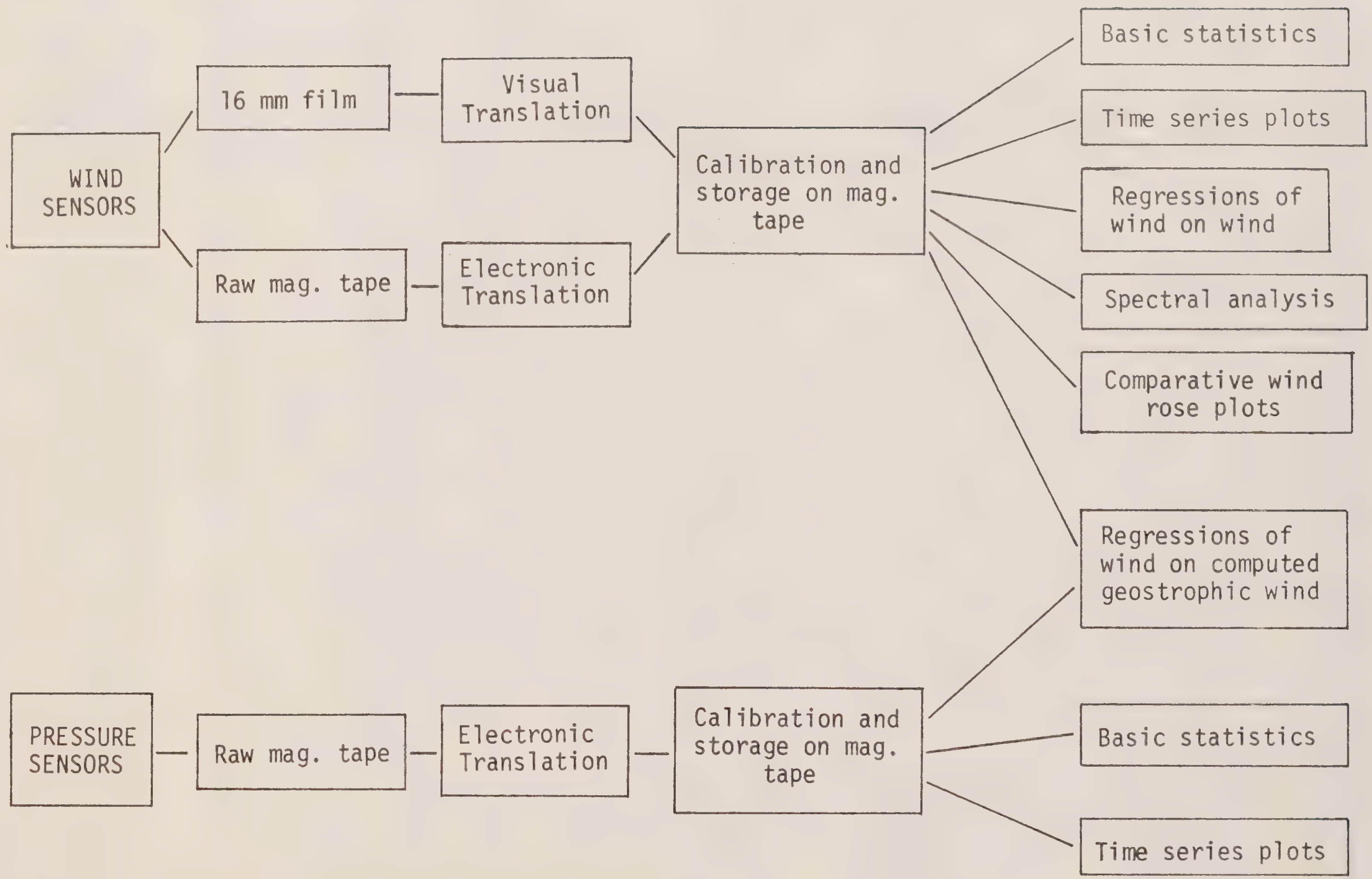
The air pressure measurements were made with Applied Microsystems gauges (sampling interval = 7.5 min), at stations 3, 4, 5 and 6, and an Aanderaa Water Level gauge (sampling interval = 30 min) at station 7. In both types of instruments the pressure is measured by quartz crystal oscillators manufactured by Paroscientific Inc. (Paros. 1976). The digital resolution of these sensors is estimated at better than 0.001% of the full scale pressure range corresponding to 0.02 mbar for stations 3, 4, 5, and 6, and 0.01 mbar for station 7. In practice, the actual accuracy depends on environmental considerations, particularly the operating temperature (Paros, 1976). Our calibration tests suggest a difference in indicated pressure of 1.7 mbar between temperatures of 0°C and 20°C. Based on the temperature recorded at Resolute, the temperatures over the measurement period had a range of about 10°C, corresponding to an uncertainty of 1 mbar in the absolute pressure data. For comparisons of simultaneous pressure measurements at different sites, the uncertainty will be less than 1.0 mbar since the temperatures are expected to be highly correlated among the various locations. In computing absolute values of air pressure, the 0°C pressure calibration data was used.

3.3 Data Processing

A schematic representation of data processing pathways can be seen in Figure 4.

Raw data tapes from instruments giving direct digital readout (Aanderaa data loggers and Applied Microsystems pressure gauges) were translated electronically using a Hewlett-Packard 2100S computer. The resulting data were then processed, calibrated and written in final form on magnetic tape using the UNIVAC 1106 computer at the Institute of Ocean Sciences, Patricia Bay. Raw data on 16 mm film from the Braincon recording anemometers were digitized by visual means and then punched on cards.

Figure 4. Data processing flowchart



These data were then checked for keypunch errors, calibrated and written in final form on magnetic tape, using the UNIVAC 1106 computer. Atmospheric pressures were written in millibars, reduced to mean sea-level based on air density computed with an air temperature of 5°C and 100% humidity. Wind speeds were written in metres/second, and wind directions (i.e. the direction *from* which the wind blows) in degrees true.

Basic statistics (mean, standard deviation, maximum and minimum) were calculated for all data, and the time-series of atmospheric pressure, wind speed, wind direction, and the North and East components of the wind vector were plotted. Joint speed/direction frequency charts were generated for the wind data, both for the entire period of observation at each station, and also for selected periods, so that comparisons among stations could be made.

In order to assess the degree of inter-relationship between winds at Resolute and those measured at other sites in Parry Channel, linear regressions of winds at outlying stations on the wind recorded at Resolute were calculated according to the method of Panofsky and Brier (1958). Since the data at Resolute was hourly, data from other stations had to be reduced to hourly by calculating averages of data on either side of the hourly period. Other than this, the data was not smoothed or processed in any way before performing the regression. The program was written with the inclusion of specified time lags (which could be positive or negative) between predictor and predictand, so that temporal variation in the inter-relationship could also be examined. Variation of the correlation coefficients with the frequency of wind variations was not examined. As a further visual check on how winds at outlying stations related to those in Resolute, a computer program was devised to compute and plot comparative wind roses for each of the five outlying wind stations. Eight roses were plotted for each station, each one corresponding to winds at Resolute from each of the eight principal compass directions. Each rose then shows the direction distribution (on a 16-point compass) of winds at the outlying station corresponding to wind from a particular direction at Resolute. Each rose is labelled with the wind direction at Resolute, and with the percentage of the total wind observations at Resolute which came from that direction. A variable low-speed cut-off was built into the program so that, when wind speed at either Resolute or the outlying station was less than the desired cut-off speed, the observation would be deleted. The wind roses seen in Figures 16 through 18 resulted from data periods of varying lengths and a low-speed cut-off of 3 m/s.

Geostrophic winds resulting from instantaneous pressure differences between two stations were also calculated in a limited number of cases, using the relationship

$$U_g = \frac{100 \times \Delta p}{D 2 \Omega \rho \sin[\theta_1 + \theta_2)/2]}$$

where :

U_g = geostrophic wind speed (m/s)

Δp = pressure difference (mbar)

D = distance between the two stations (metres)

Ω = rate of angular rotation of the earth (sec^{-1})

ρ = density of air (kg/m^3)

θ_1, θ_2 = the latitudes of the two stations

The direction of the geostrophic wind was taken to be 90 degrees to the right of a line joining the two stations used. These calculated geostrophic winds were compared to winds recorded at either of the two pressure stations. The component of the recorded wind along the direction of the geostrophic wind was calculated, and a linear regression of this component on the calculated geostrophic wind was performed - again using specified time lags to examine the temporal variation of the inter-relationship.

Spectral analysis techniques [given in detail in Fissel (1976)] were used to examine the power spectral density of the time-series wind data. Fourier sine and cosine coefficients were calculated for the wind speed and the North and East components of the wind vector using the Fast Fourier Transform algorithm devised by Singleton (1969). These coefficients were then used to calculate the power spectral density, which is given by

$$\Phi x\ (f) = [a(f)^2 + b(f)^2] \ / \ 2\Delta f$$

where f = frequency

Δf = the reciprocal of the time sequence duration

$a(f), b(f)$ = Fourier coefficients

Groups of 5 adjacent raw spectral estimates were averaged in order to reduce random error, and the resulting curves of power spectral density versus frequency were plotted.

4. RESULTS

4.1 Winds

4.1.1 General Comments

Over the Parry Channel region, the mean pressure distribution for July (Pilot of Arctic Canada, 1970) suggests a weak net flow of air to the south. A ten-year summary of the hourly wind observations at Resolute (Atmospheric Environment Service, 1975) shows that the most common winds observed during the months of July through September are W through N, and E through S in direction. While the former range of directions are more frequent, winds in the latter range tend to have higher mean speeds (9.5 m/s for E winds against 7.0 m/s for N winds).

The wind data collected for this study is presented as time series plots in Figures 5 to 8 with the basic statistics and joint frequency distributions of speed and direction for the entire data record of each station given in Appendix 1. The winds at Resolute over the three month period, July through September 1977, had much the same direction distribution as did the ten-year means for the same time of year (Atmospheric Environment Service, 1975), indicating that winds during the observation period covered by this report were typical - at least in their direction distribution. One noteworthy feature of the wind data is the reversal, in late August 1977, of the E-W wind component; as seen in the time series plots for Resolute and Cape Charles Yorke (Figure 8), prior to late August the component of the wind parallel to Parry Channel was from the E, whereas after late August the wind blew from the W. Such a reversal, if repeated in other years, could have important consequences to the movements of ice and water in Parry Channel.

4.1.2 Power Spectra

The power spectra of wind speed and N-S and E-W components, shown in Figures 9 through 14, all indicate that the largest variations all occur at the lowest resolvable frequencies. A steady decline of the power spectral levels with increasing frequency is seen; no statistically significant peaks are found in the diurnal and semi-dirunal frequency bands. At the lowest frequencies, the E-W component had larger spectral levels than the N-S component; this difference is statistically significant at all locations, with the exception of Resolute and Griffith Island.

4.2 Comparison of Parry Channel Stations with Resolute

When comparing the results from different stations, it must be remembered that all the anemometers were not at the same height above ground-level. Mean wind speeds over a common time period are corrected to a standard anemometer height of 10 m in Appendix 2. The results indicate that an increase in speed of approximately 10 to 12% is appropriate for stations 1, 3 and 4. In addition, the anemometers were located at varying heights above mean sea level. It should also be recalled that all anemometers do not have the same sampling rates, so that, for example, records from the Braincon anemometers, which sample four times per hour, appear more variable in the time-series plots than records from other anemometers which sample one or two times per hour.

In the following sub-sections, we shall compare, in detail, the winds observed at outlying stations with the winds measured at the Atmospheric Environment Station at Resolute.

4.2.1 Basic Statistics and Joint Frequency Distributions

Basic statistics and joint frequency distributions of wind speed and direction can be seen in Tables 1 through 9. Mean wind speeds over common time periods are corrected to 10 m anemometer height in Appendix 2.

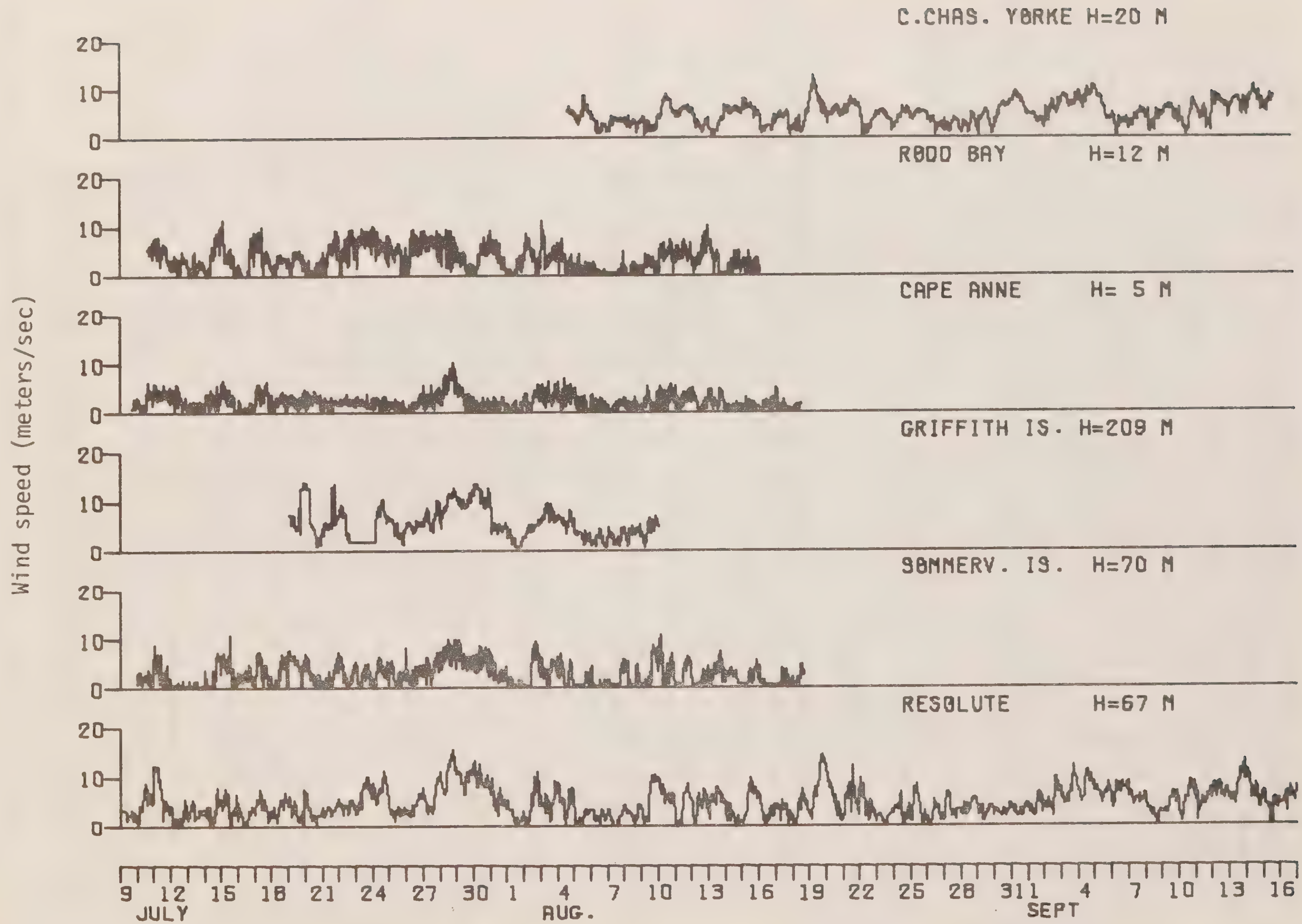


Figure 5. Time series plots of wind speed. 'H' is anemometer height above mean sea level.

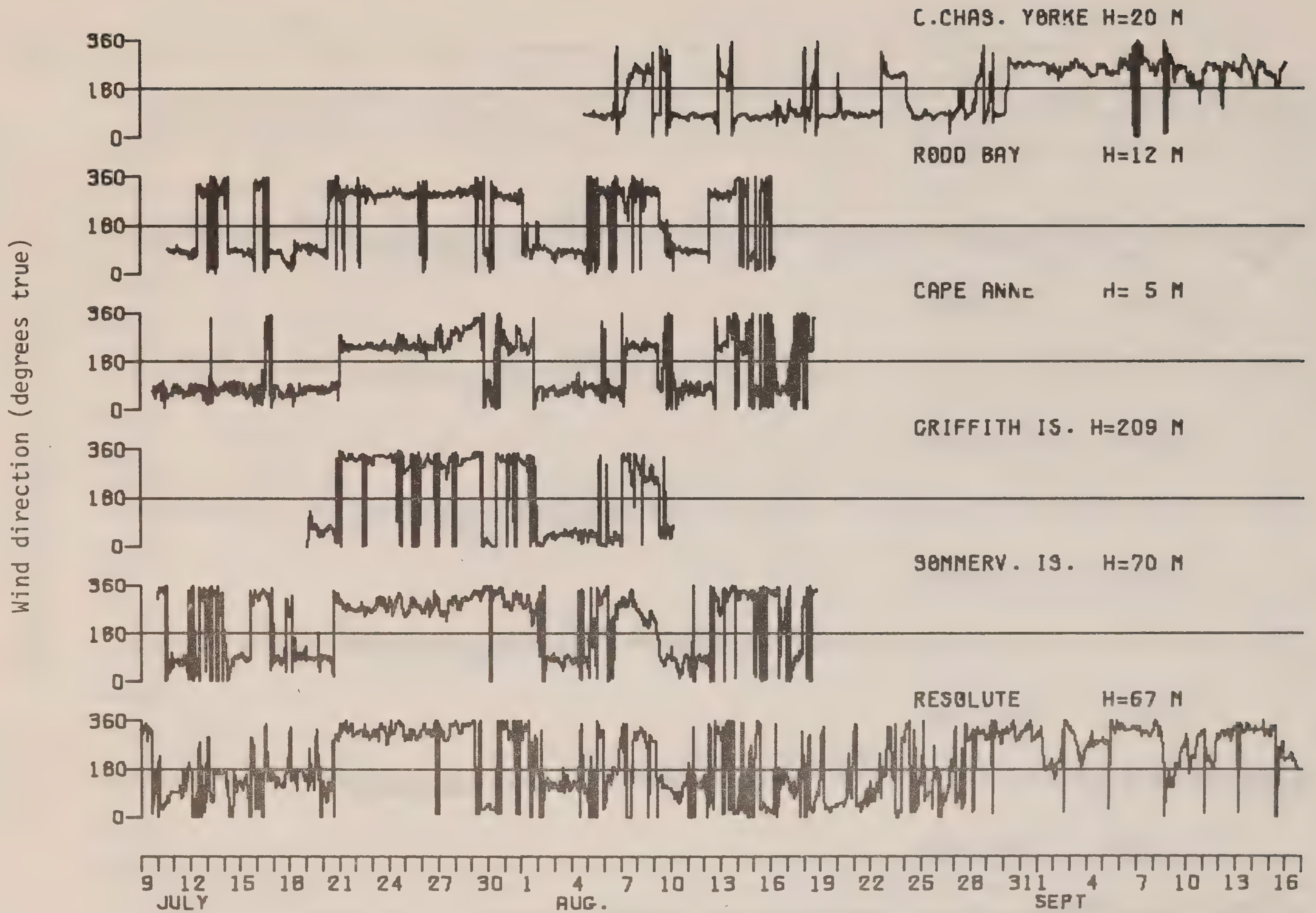


Figure 6. Time series plots of wind direction. 'H' is anemometer height above mean sea level.

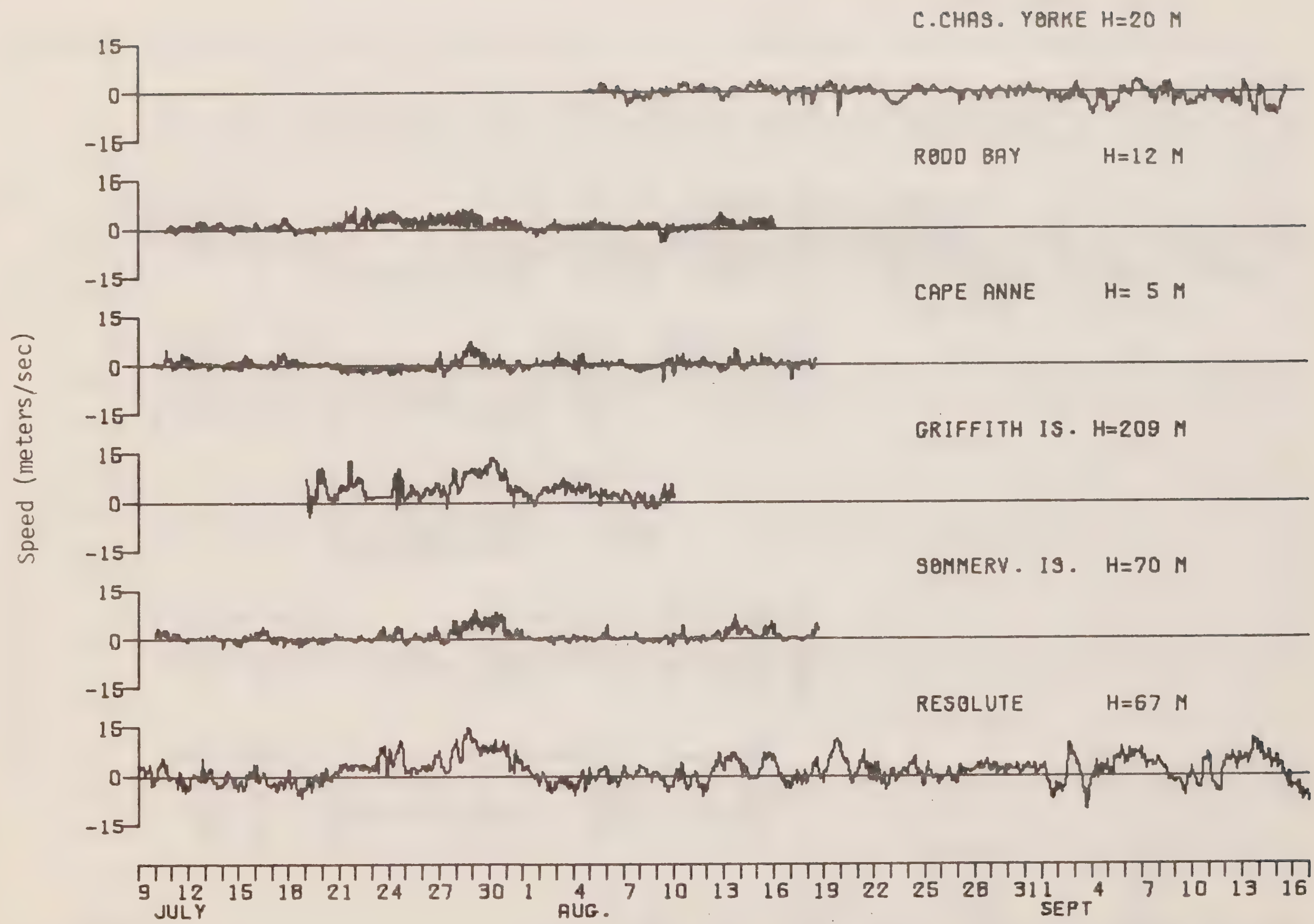


Figure 7. Time series plots of North component of wind velocity. 'H' is anemometer height above mean sea level.

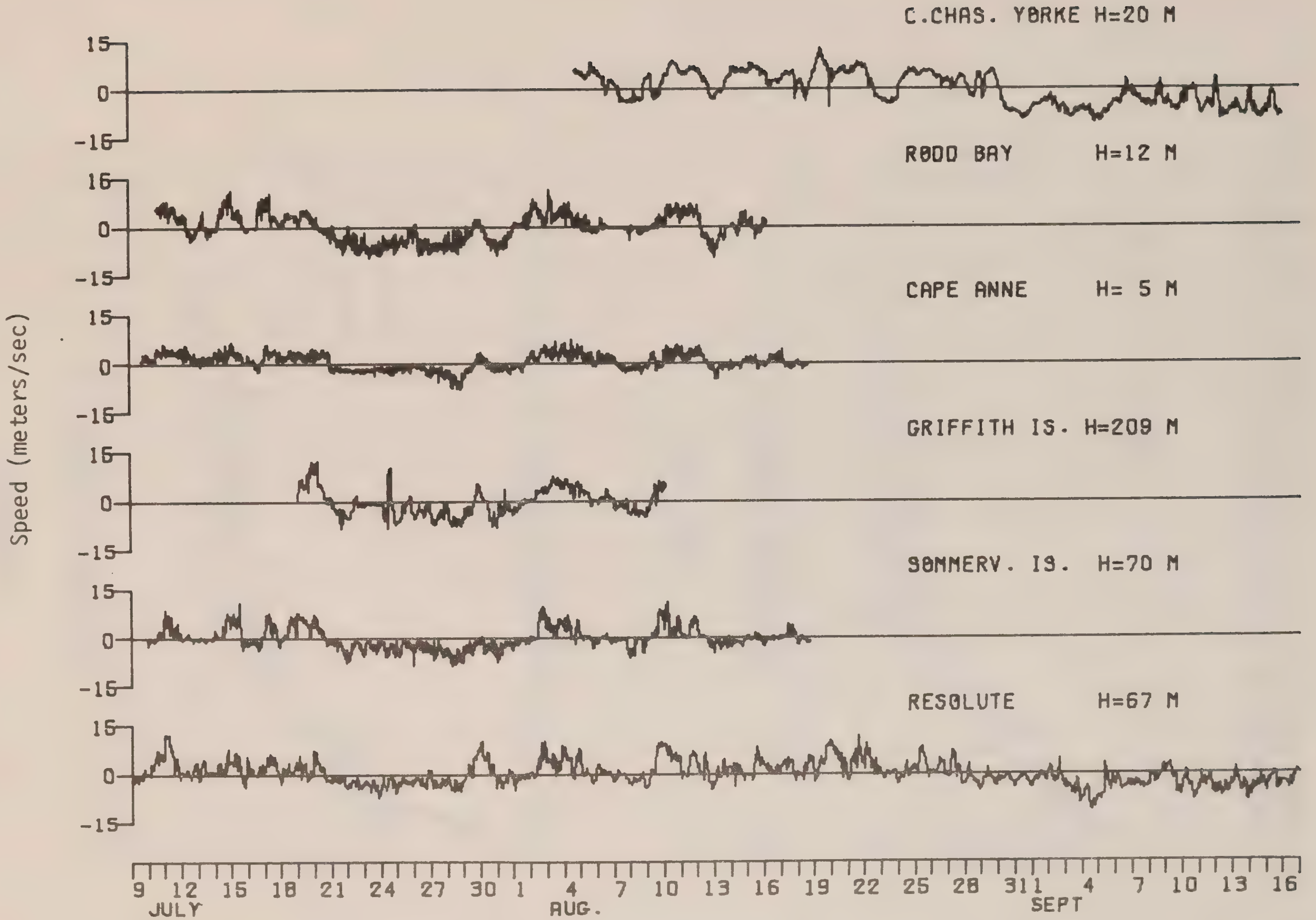


Figure 8. Time series plots of East component of wind velocity. 'H' is anemometer height above mean sea level.

Fig. 9. Power spectral density estimates of the wind speed and components at Resolute.

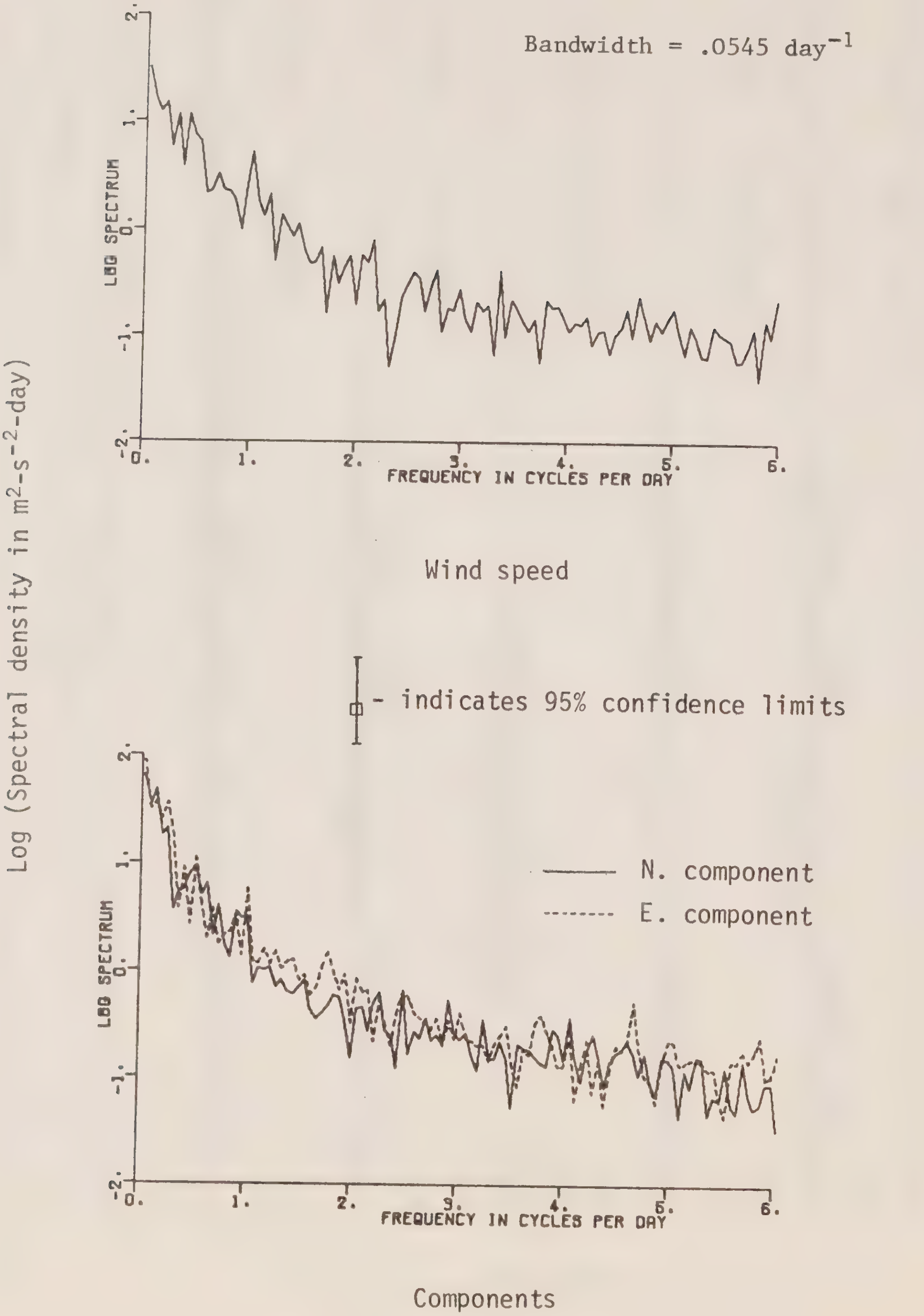
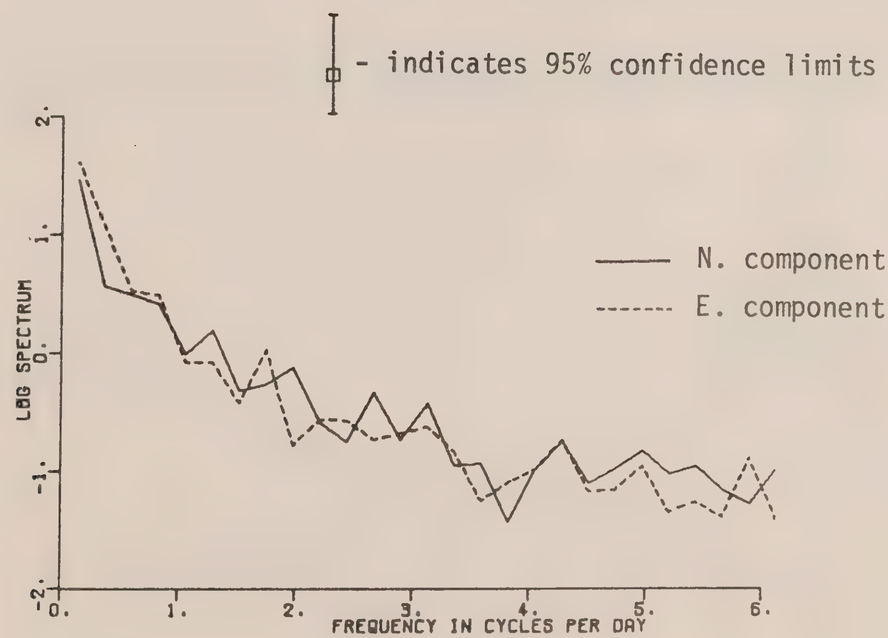


Fig. 10. Power spectral density estimates of the wind speed and components at Griffith Island.

Wind speed

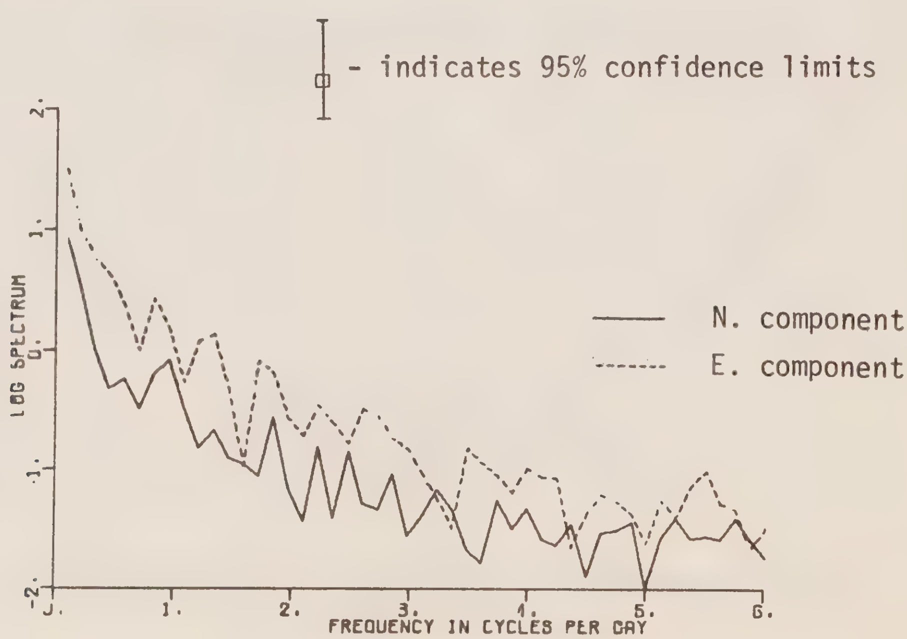


Components

Fig. 11. Power spectral density estimates of the wind speed and components at Somerville Island.

Log (Spectral density in m^2-s^{-2}-day)

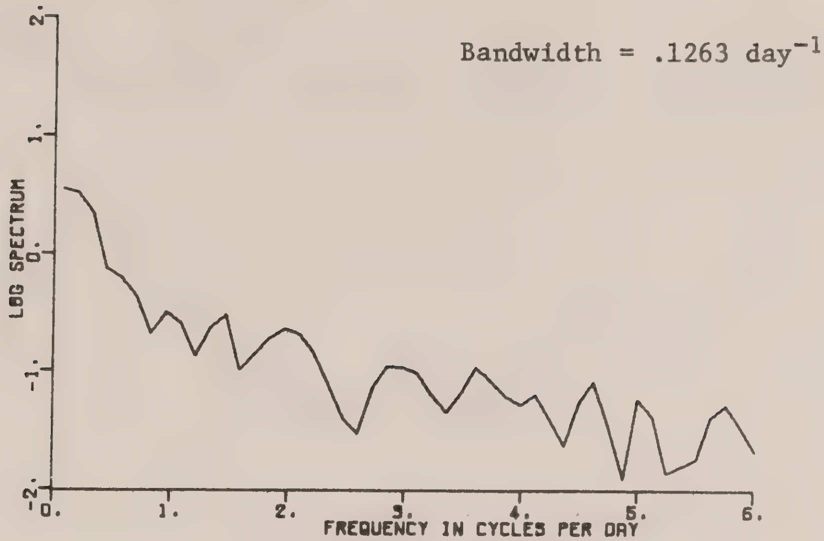
Wind speed



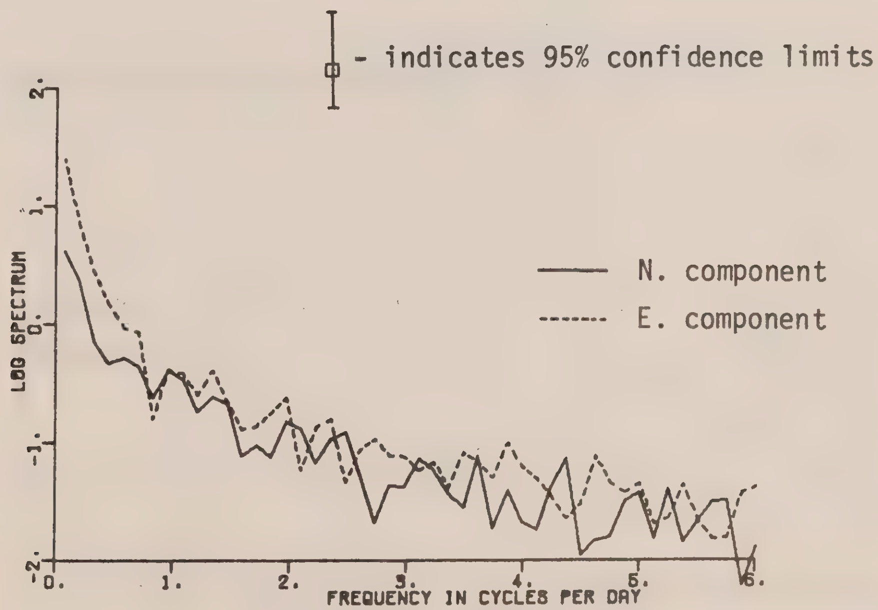
Components

Fig. 12. Power spectral density estimates of the wind speed and components at Cape Anne.

Log (Spectral density in m^2-s^{-2}-day).



Wind speed



Components

Fig. 13. Power spectral density estimates of the wind speed and components at Rodd Bay

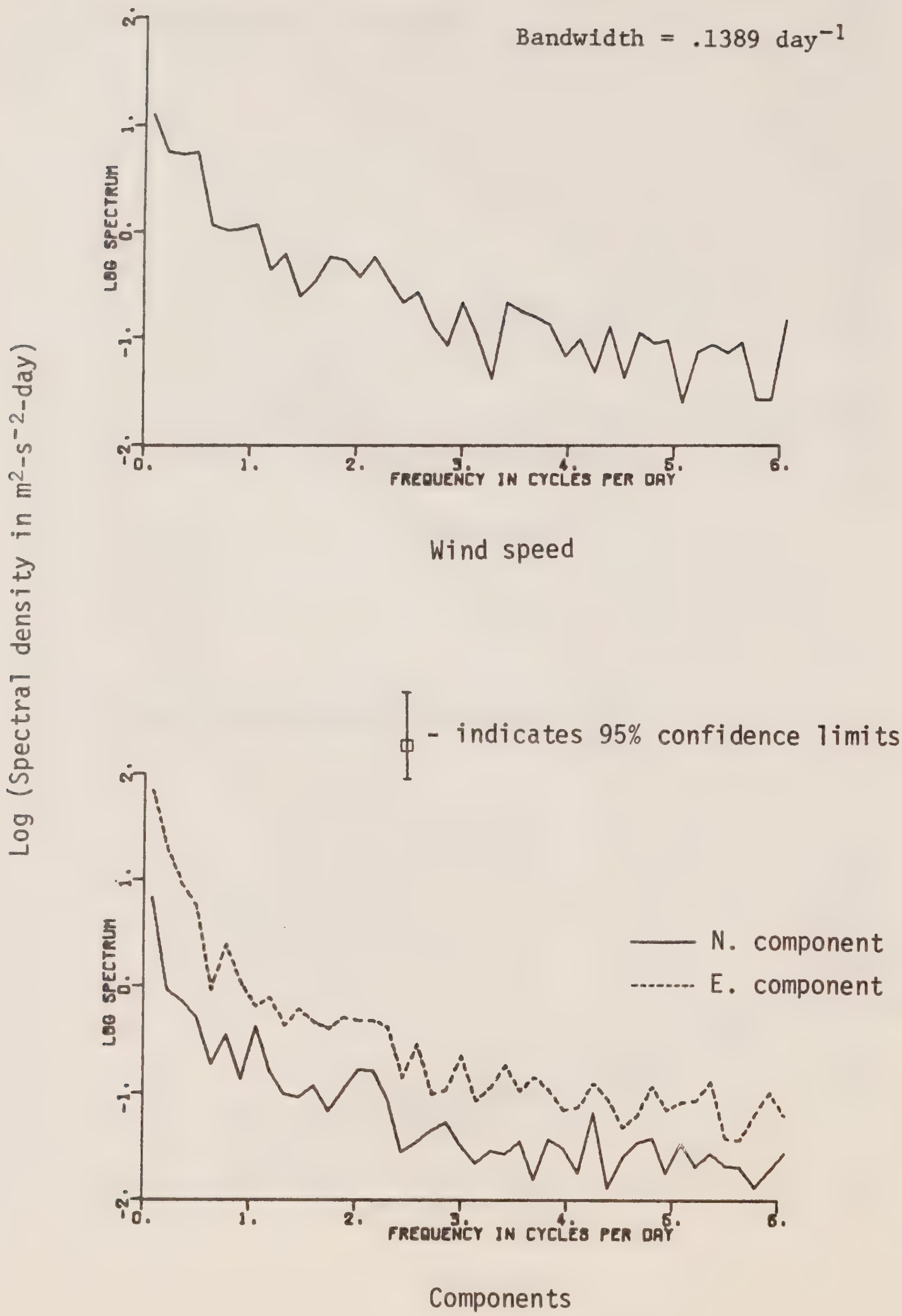
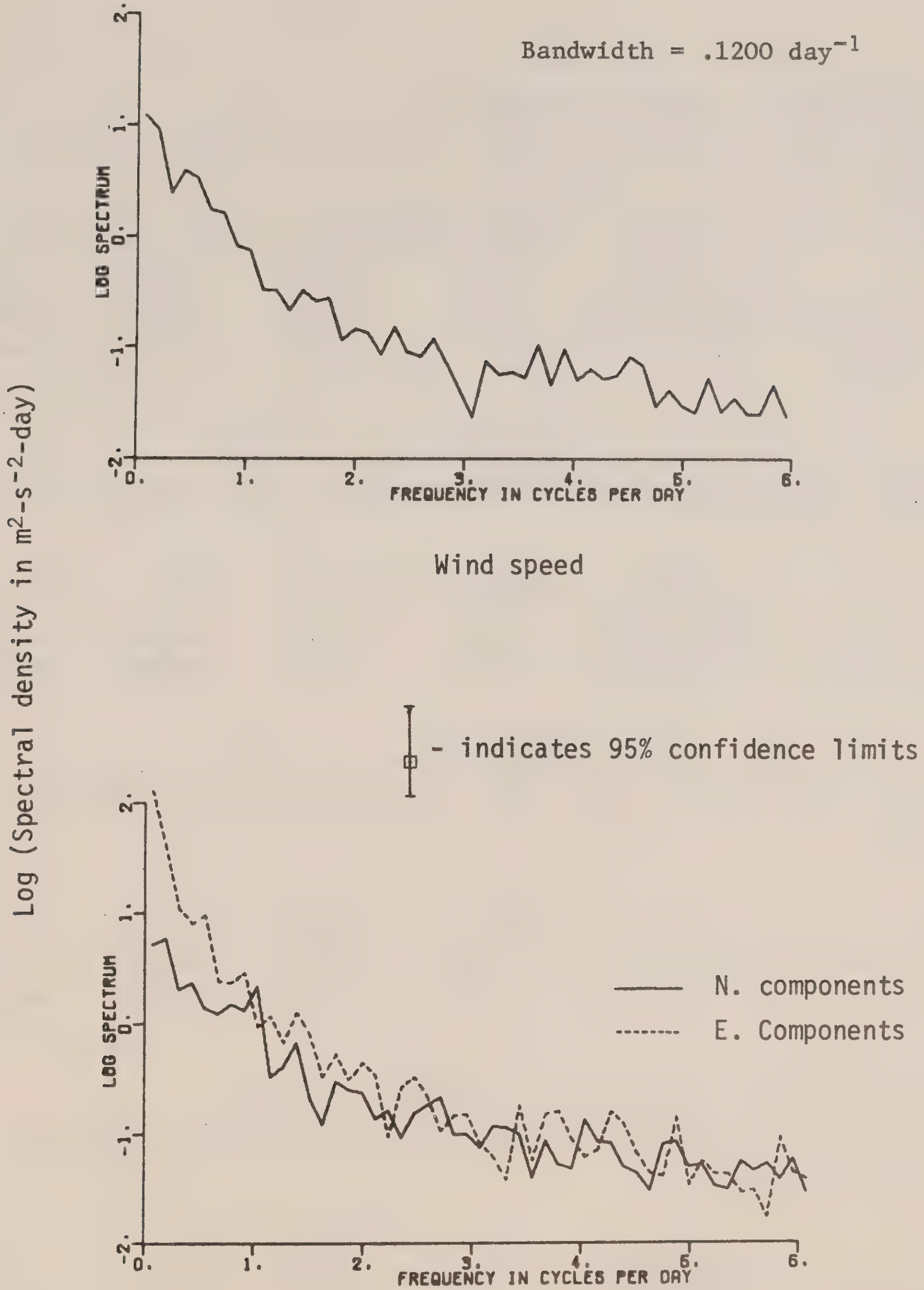


Fig. 14. Power spectral density estimates of the wind speed and components at Cape Charles Yorke.



Wind speed

Components

Table 1 : Basic statistics of winds. 21.5 day period.

STATION: GRIFFITHS . INSTRUMENT/TAPE: 74/1
LAT: 74 DEG 31 MIN 0 SEC N. LONG: 95 DEG 10 MIN 0 SEC W.
1032 RECORDS PROCESSED. START TIME: 3: 0 HRS GMT, 19/ 7 1977.
RECORDS/HOUR= 2

PARAMETER	UNITS	MEAN	STD.DEV.	MAX.	MIN.
SPEED	METERS/SEC	5.64	3.30	14.01	.54
N-S COMPONENT	METERS/SEC	3.99	3.33	13.86	-4.54
E-W COMPONENT	METERS/SEC	-.47	3.94	12.42	-8.34

STATION: RODD BAY. INSTRUMENT/TAPE: 77/1
LAT: 73 DEG 55 MIN 30 SEC N. LONG: 90 DEG 18 MIN 0 SEC W.
2064 RECORDS PROCESSED. START TIME: 3: 0 HRS GMT, 19/ 7 1977.
RECORDS/HOUR= 4

PARAMETER	UNITS	MEAN	STD.DEV.	MAX.	MIN.
SPEED	METERS/SEC	3.78	2.64	11.20	.00
N-S COMPONENT	METERS/SEC	1.36	1.58	6.94	-4.55
E-W COMPONENT	METERS/SEC	-1.61	3.78	11.19	-9.49

STATION: S,VILLE IS. INSTRUMENT/TAPE: 75/1
LAT: 74 DEG 44 MIN 0 SEC N. LONG: 96 DEG 10 MIN 0 SEC W.
2064 RECORDS PROCESSED. START TIME: 3: 0 HRS GMT, 19/ 7 1977.
RECORDS/HOUR= 4

PARAMETER	UNITS	MEAN	STD.DEV.	MAX.	MIN.
SPEED	METERS/SEC	3.18	2.29	9.96	.23
N-S COMPONENT	METERS/SEC	1.00	1.87	9.36	-1.77
E-W COMPONENT	METERS/SEC	-.98	3.15	9.72	-8.44

STATION: CAPE ANNE. INSTRUMENT/TAPE: 78/1
LAT: 74 DEG 6 MIN 0 SEC N. LONG: 94 DEG 44 MIN 0 SEC W.
2064 RECORDS PROCESSED. START TIME: 3: 0 HRS GMT, 19/ 7 1977.
RECORDS/HOUR= 4

PARAMETER	UNITS	MEAN	STD.DEV.	MAX.	MIN.
SPEED	METERS/SEC	2.46	1.55	10.42	.23
N-S COMPONENT	METERS/SEC	.03	1.49	7.37	-5.04
E-W COMPONENT	METERS/SEC	-.18	2.49	7.15	-7.97

Table 1 (Cont'd) : Basic statistics of winds, 21.5 day period.

STATION: RESOLUTE . INSTRUMENT/TAPE:
LAT: 74 DEG 41 MIN 0 SEC N. LONG: 94 DEG 54 MIN 0 SEC W.
516 RECORDS PROCESSED. START TIME: 3: 0 HRS GMT, 19/ 7 1977.
RECORDS/HOUR= 1

PARAMETER	UNITS	MEAN	STD.DEV.	MAX.	MIN.
SPEED	METERS/SEC	4.83	3.27	15.64	.00
N-S COMPONENT	METERS/SEC	2.51	4.08	14.70	-5.82
E-W COMPONENT	METERS/SEC	-.13	3.33	10.50	-7.15

Table 2 : Basic statistics of winds. 42 day period.

STATION: RESOLUTE . INSTRUMENT/TAPE:
LAT: 74 DEG 41 MIN 0 SEC N. LONG: 94 DEG 54 MIN 0 SEC W.
1008 RECORDS PROCESSED. START TIME: 18: 0 HRS GMT, 4/ 8 1977.
RECORDS/HOUR= 1

PARAMETER	UNITS	MEAN	STD.DEV.	MAX.	MIN.
SPEED	METERS/SEC	4.56	2.79	14.75	.00
N-S COMPONENT	METERS/SEC	1.48	3.41	11.45	-10.84
E-W COMPONENT	METERS/SEC	-.34	3.83	11.76	-11.45

STATION: C. Chas. Yorke INSTRUMENT/TAPE:
LAT: 73 DEG 43 MIN 0 SEC N. LONG: 82 DEG 45 MIN 0 SEC W.
2016 RECORDS PROCESSED. START TIME: 18: 0 HRS GMT, 4/ 8 1977.
RECORDS/HOUR= 2

PARAMETER	UNITS	MEAN	STD.DEV.	MAX.	MIN.
SPEED	METERS/SEC	4.99	2.22	12.92	.30
N-S COMPONENT	METERS/SEC	-.49	1.94	4.15	-7.48
E-W COMPONENT	METERS/SEC	-.24	5.07	12.72	-10.53

Table 3 : Joint frequency distribution of wind speed and direction.

PROGRAM: BARROW STRAIT WINDS STATION: RESOLUTE

WIND RECORDS FROM 21 DAYS STARTING AT 6:00 HRS GMT ON 19/ 7,
1977 WERE EXAMINED.
504 MEASUREMENTS WERE PROCESSED IN THIS ANALYSIS.

SPEED CLASS(M/SEC)

		0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-22	22-24	24-INF	TOTAL
	N :	29	10	10	18	22	14	5	2	0	0	0	0	0*	110
W	NNE :	0	1	1	0	12	5	1	0	0	0	0	0	0*	20
I	NE :	0	1	1	0	1	6	4	0	0	0	0	0	0*	13
N	ENE :	0	3	1	0	0	0	0	0	0	0	0	0	0*	4
D	E :	1	4	7	5	3	1	0	0	0	0	0	0	0*	21
	ESE :	4	3	17	6	4	1	0	0	0	0	0	0	0*	35
D	SE :	6	9	5	6	1	0	0	0	0	0	0	0	0*	27
I	SSE :	8	3	4	0	0	0	0	0	0	0	0	0	0*	15
R	S :	14	7	0	0	0	0	0	0	0	0	0	0	0*	21
E	SSW :	2	0	0	0	0	0	0	0	0	0	0	0	0*	2
C	SW :	2	0	0	0	0	0	0	0	0	0	0	0	0*	2
T	WSW :	1	0	0	0	0	0	0	0	0	0	0	0	0*	1
I	W :	14	7	3	2	0	0	0	0	0	0	0	0	0*	26
O	WNW :	3	33	21	2	0	0	0	0	0	0	0	0	0*	59
N	NW :	4	40	25	7	1	0	0	0	0	0	0	0	0*	77
	NNW :	6	30	7	8	13	3	3	1	0	0	0	0	0*	71
	TOTAL :	94	151	102	54	57	30	13	3	0	0	0	0	0*	504

Table 4 : Joint frequency distribution of wind speed and direction.

PROGRAM: DRAINCON WIND DATA (DREP) STATION: S,VILLE IS

WIND RECORDS FROM 21 DAYS STARTING AT 6:00 HRS GMT ON 19/ 7,
1977 WERE EXAMINED.
2016 MEASUREMENTS WERE PROCESSED IN THIS ANALYSIS.

SPEED CLASS(M/SEC)

		0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-22	22-24	24-INF	TOTAL
	N :	27	6	18	18	0	0	0	0	0	0	0	0	0*	69
W	NNE :	21	0	0	0	0	0	0	0	0	0	0	0	0*	21
I	NE :	24	0	0	0	0	0	0	0	0	0	0	0	0*	24
N	ENE :	37	40	4	0	0	0	0	0	0	0	0	0	0*	81
D	E :	27	66	110	64	7	0	0	0	0	0	0	0	0*	274
	ESE :	9	2	8	5	0	0	0	0	0	0	0	0	0*	24
D	SE :	9	0	0	0	0	0	0	0	0	0	0	0	0*	9
I	SSE :	18	0	0	0	0	0	0	0	0	0	0	0	0*	18
R	S :	12	0	0	0	0	0	0	0	0	0	0	0	0*	12
E	SSW :	18	0	0	0	0	0	0	0	0	0	0	0	0*	18
C	SW :	53	0	0	0	0	0	0	0	0	0	0	0	0*	53
T	WSW :	61	38	23	1	0	0	0	0	0	0	0	0	0*	123
I	W :	131	118	122	24	4	0	0	0	0	0	0	0	0*	399
O	WNW :	194	114	59	28	5	0	0	0	0	0	0	0	0*	400
N	NW :	114	76	50	57	19	0	0	0	0	0	0	0	0*	316
	NNW :	38	32	42	54	9	0	0	0	0	0	0	0	0*	175
	TOTAL :	793	492	436	251	44	0	0	0	0	0	0	0	0*	2016

Table 5 : Joint frequency distribution of wind speed and direction.

PROGRAM: RADAR STATION: GRIFFITHS

WIND RECORDS FROM 21 DAYS STARTING AT 6:00 HRS GMT ON 19/ 7,
1977 WERE EXAMINED.
1008 MEASUREMENTS WERE PROCESSED IN THIS ANALYSIS.

SPEED CLASS(M/SEC)

		0- 2	2- 4	4- 6	6- 8	8- 10	10- 12	12- 14	14- 16	16- 18	18- 20	20- 22	22- 24	24- INF	TOT AL
	N :	15	43	23	3	17	12	18	0	0	0	0	0	0*	131
W	NNE :	10	32	21	5	1	11	2	0	0	0	0	0	0*	82
I	NE :	15	29	30	42	16	0	15	1	0	0	0	0	0*	148
N	ENE :	3	8	29	11	5	0	10	0	0	0	0	0	0*	66
D	E :	2	1	5	1	2	1	0	0	0	0	0	0	0*	12
	ESE :	0	0	0	3	0	0	0	0	0	0	0	0	0*	3
D	SE :	1	0	0	2	0	0	0	0	0	0	0	0	0*	3
I	SSE :	1	0	0	0	0	0	0	0	0	0	0	0	0*	1
R	S :	4	0	0	0	0	0	0	0	0	0	0	0	0*	4
E	SSW :	2	1	0	0	0	0	0	0	0	0	0	0	0*	3
C	SW :	4	7	0	0	0	0	0	0	0	0	0	0	0*	11
T	WSW :	0	16	15	0	1	0	0	0	0	0	0	0	0*	32
I	W :	3	11	6	5	0	0	0	0	0	0	0	0	0*	25
O	WNW :	7	12	26	27	5	0	0	0	0	0	0	0	0*	77
N	NW :	22	27	71	16	23	21	6	0	0	0	0	0	0*	186
	NNW :	67	19	45	22	38	24	9	0	0	0	0	0	0*	224
	TOTAL :	156	206	271	137	108	69	60	1	0	0	0	0	0*	1008

Table 6 : Joint frequency distribution of wind speed and direction.

PROGRAM: BRAINCON WIND DATA (DREP) STATION: CAPE ANNE

WIND RECORDS FROM 21 DAYS STARTING AT 6:00 HRS GMT ON 19/ 7, 1977 WERE EXAMINED.
2016 MEASUREMENTS WERE PROCESSED IN THIS ANALYSIS.

SPEED CLASS(M/SEC)

		0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-22	22-24	24-INF	TOTAL
	N :	10	10	1	0	0	0	0	0	0	0	0	0	0*	21
W	NNE :	13	5	0	0	0	0	0	0	0	0	0	0	0*	18
I	NE :	35	16	15	0	0	0	0	0	0	0	0	0	0*	66
N	ENE :	140	143	13	0	0	0	0	0	0	0	0	0	0*	296
D	E :	64	220	71	4	0	0	0	0	0	0	0	0	0*	359
	ESE :	5	13	5	0	0	0	0	0	0	0	0	0	0*	23
D	SE :	1	1	0	0	0	0	0	0	0	0	0	0	0*	2
I	SSE :	0	0	0	0	0	0	0	0	0	0	0	0	0*	0
R	S :	2	0	0	0	0	0	0	0	0	0	0	0	0*	2
E	SSW :	9	3	0	0	0	0	0	0	0	0	0	0	0*	12
C	SW :	235	270	1	0	0	0	0	0	0	0	0	0	0*	506
T	WSW :	302	97	2	0	0	0	0	0	0	0	0	0	0*	401
I	W :	30	38	13	6	0	0	0	0	0	0	0	0	0*	87
O	WNW :	10	59	13	13	1	0	0	0	0	0	0	0	0*	96
N	NW :	9	9	18	24	23	1	0	0	0	0	0	0	0*	84
	NNW :	4	10	29	0	0	0	0	0	0	0	0	0	0*	43
	TOTAL :	869	894	181	47	24	1	0	0	0	0	0	0	0*	2016

Table 7 : Joint frequency distribution of wind speed and direction.

PROGRAM: BRAINCON WIND DATA (DREP) STATION: RODD BAY

WIND RECORDS FROM 21 DAYS STARTING AT 6:00 HRS GMT ON 19/ 7,
1977 WERE EXAMINED.
2016 MEASUREMENTS WERE PROCESSED IN THIS ANALYSIS.

SPEED CLASS(M/SEC)

		0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-22	22-24	24-INF *	TOTAL
	N :	33	4	2	0	0	0	0	0	0	0	0	0	0*	39
W	NNE :	18	1	0	0	0	0	0	0	0	0	0	0	0*	19
I	NE :	32	14	2	0	0	0	0	0	0	0	0	0	0*	48
N	ENE :	94	53	11	0	0	0	0	0	0	0	0	0	0*	158
D	E :	70	94	122	41	7	3	0	0	0	0	0	0	0*	337
	ESE :	5	15	3	1	0	0	0	0	0	0	0	0	0*	24
D	SE :	1	0	0	0	0	0	0	0	0	0	0	0	0*	1
I	SSE :	0	1	0	0	0	0	0	0	0	0	0	0	0*	1
R	S :	5	0	0	0	0	0	0	0	0	0	0	0	0*	5
E	SSW :	3	3	0	0	0	0	0	0	0	0	0	0	0*	6
C	SW :	19	0	0	0	0	0	0	0	0	0	0	0	0*	19
T	WSW :	5	0	0	0	0	0	0	0	0	0	0	0	0*	5
I	W :	28	17	29	6	1	0	0	0	0	0	0	0	0*	81
O	WNW :	130	93	204	286	73	1	0	0	0	0	0	0	0*	787
N	NW :	162	74	86	52	13	0	0	0	0	0	0	0	0*	387
	NNW :	70	17	8	3	1	0	0	0	0	0	0	0	0*	99
	TOTAL :	675	386	467	389	95	4	0	0	0	0	0	0	0*	2016

Table 8 : Joint frequency distribution of wind speed and direction.

PROGRAM: BARROW STRAIT WINDS STATION: RESOLUTE

WIND RECORDS FROM 42 DAYS STARTING AT 18:00 HRS GMT ON 4/ 8,
1977 WERE EXAMINED.
1008 MEASUREMENTS WERE PROCESSED IN THIS ANALYSIS.

SPEED CLASS(M/SEC)

		0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-22	22-24	24-INF	TOTAL
	N :	53	19	18	8	5	1	0	0	0	0	0	0	0*	104
W	NNE :	7	11	22	12	9	1	1	0	0	0	0	0	0*	63
I	NE :	4	5	15	10	7	3	6	2	0	0	0	0	0*	52
N	ENE :	6	6	11	9	8	0	1	0	0	0	0	0	0*	41
D	E :	3	16	18	15	12	0	0	0	0	0	0	0	0*	64
	ESE :	6	12	18	10	9	2	0	0	0	0	0	0	0*	57
D	SE :	13	11	8	2	2	0	0	0	0	0	0	0	0*	36
I	SSE :	18	16	4	0	0	0	0	0	0	0	0	0	0*	38
R	S :	21	22	12	4	0	1	0	0	0	0	0	0	0*	60
E	SSW :	6	7	10	4	0	2	1	0	0	0	0	0	0*	30
C	SW :	5	3	13	0	1	0	0	0	0	0	0	0	0*	22
T	WSW :	4	3	3	4	3	0	0	0	0	0	0	0	0*	17
I	W :	18	8	17	16	4	6	0	0	0	0	0	0	0*	69
O	WNW :	6	39	23	6	12	0	0	0	0	0	0	0	0*	86
N	NW :	6	51	42	26	14	1	2	0	0	0	0	0	0*	142
	NNW :	9	42	26	31	14	5	0	0	0	0	0	0	0*	127
	TOTAL :	185	271	260	157	100	22	11	2	0	0	0	0	0*	1008

Table 9 : Joint frequency distribution of wind speed and direction.

PROGRAM: LANCASTER SOUND PROJECT   STATION: Cape Charles Yorke

WIND RECORDS FROM 42 DAYS STARTING AT 18:00 HRS GMT ON 4/ 8, 1977 WERE EXAMINED.
2016 MEASUREMENTS WERE PROCESSED IN THIS ANALYSIS.

		SPEED CLASS(M/SEC)													
		0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-22	22-24	24-INF	* TOTAL
	N :	5	11	1	0	0	0	0	0	0	0	0	0	0*	17
W	NNE :	7	4	0	0	0	0	0	0	0	0	0	0	0*	11
I	NE :	11	13	1	0	0	0	0	0	0	0	0	0	0*	25
N	ENE :	16	46	90	71	22	9	0	0	0	0	0	0	0*	254
D	E :	26	133	302	96	10	3	2	0	0	0	0	0	0*	572
	ESE :	17	29	5	1	0	0	0	0	0	0	0	0	0*	52
D	SE :	14	3	4	0	0	0	0	0	0	0	0	0	0*	21
I	SSE :	7	7	4	3	0	0	0	0	0	0	0	0	0*	21
R	S :	18	21	8	6	0	0	0	0	0	0	0	0	0*	53
E	SSW :	7	26	11	6	1	0	0	0	0	0	0	0	0*	51
C	SW :	12	63	80	29	35	6	0	0	0	0	0	0	0*	225
T	WSW :	5	77	59	74	35	10	0	0	0	0	0	0	0*	260
I	W :	13	45	99	114	74	2	0	0	0	0	0	0	0*	347
O	WNW :	9	22	16	13	5	0	0	0	0	0	0	0	0*	65
N	NW :	11	7	2	1	0	0	0	0	0	0	0	0	0*	21
	NNW :	10	9	2	0	0	0	0	0	0	0	0	0	0*	21
	TOTAL :	188	516	684	414	182	30	2	0	0	0	0	0	0*	2016

4.2.1 (a) July 19 - August 8 : Resolute, Griffith Island, Somerville Island, Cape Anne, Rodd Bay.

Even after correction to the 10 m standard anemometer height, it is clear that wind speeds at Resolute and Griffith Island are considerably higher than at the other 3 stations. Griffith Island winds were higher than those at Resolute, which might have been expected since the anemometer at Griffith Island was in a comparatively high, very exposed location on the edge of a steep cliff. However, the mean wind speed at Somerville Island (which is very close to Resolute, with nearly the same anemometer height above mean sea level, but with a much more exposed location) is much lower than the mean wind speed at Resolute - which is surprising. Virtually all of the recorded wind speeds at Somerville Island, Cape Anne and Rodd Bay were below 10 m/s, compared with only 87.1% at Griffith Island, and 90.9% at Resolute. All stations show a net flow from the north, with both Resolute and Griffith Island having a significantly higher mean N-S component than the others. As for the E-W component, all stations also show a net flow from the west, as evidenced by the negative mean value of the component in all cases.

Some interesting facts emerge from a comparison of the direction distribution of the winds at Resolute relative to those at Somerville Island. Somerville Island is a small, low, regularly-shaped island, roughly 14 km from the nearest point on Cornwallis Island and 33 km from Resolute. Because of its exposed location, free from any major topographical effects on the wind field, it is felt that wind measurements at Somerville Island are probably the best indicator we have of the undistorted wind field in the Resolute area. Differences between Somerville Island winds and Resolute winds are then likely to reflect topographic effects on winds in Resolute.

Somerville Island winds have a sharp peak in the direction distribution in the E direction. This peak does not show up in the Resolute distribution, but appears to be "smeared out" into directions from E through S. This may be caused by the possible deflection of E winds in their passage over the low hills to the northeast (NE) of the weather station at Resolute, which run in an approximately northwest (NW) - SE direction. These low hills may also deflect W and west-northwest (WNW) winds, which are the most common directions at Somerville Island, into the NW through N directions, which are most common at Resolute. One other topographic feature which strongly affects the wind distribution at Resolute is the large, high hill to the SW of the station. This hill effectively seems to eliminate nearly all south-southwest (SSW) through west-southwest (WSW) winds (which are uncommon, but not absent at Somerville Island) from the weather station at Resolute.

The wind distribution at Griffith Island has similarities to the distribution at Resolute and Somerville Island. The most common wind

directions at Griffith Island are NW through N, similar to Resolute. Winds from the east-southeast (ESE) to SSW are almost entirely absent, similar to Somerville Island. One unique feature is the large number of winds from the NE which are not seen at either Resolute or Somerville Island. These differences may be attributed to the fact that the anemometer at Griffith Island was about three times as high above sea level as the others, and was on the edge of a high, east-facing cliff.

Both Rodd Bay and Cape Anne have peaks in the wind distribution at the E direction, similar to Somerville Island. However, their distributions are otherwise very different one from the other, and from either Resolute or Somerville Island. Rodd Bay shows a very sharp peak in the WNW direction, and virtually no winds in the north-northwest (NNW) through NE, and ESE through WSW directions. Thus winds at Rodd Bay are almost entirely east-northeast (ENE)/E and WNW/NW, which is apparent in the power spectra curves (see Figure 13) showing much larger power spectra levels for the E-W component than for the N-S component in all frequency bands examined. This dominance of the E-W flow is surprising, because the topography at Rodd Bay shows a natural N-S channel for wind movement. It seems likely that winds blowing directly into or out of Prince Regent Inlet in the region of Rodd Bay were rare or absent during the period of observation, since those winds would most likely be funnelled down that channel, producing winds that would be strongly N or S in direction. Cape Anne winds had a peak in the direction distribution in the SW/WSW directions, which were not common wind directions in any of the other stations examined. Perhaps these were westerly winds deflected by the coastline of Somerset Island, which runs approximately SW-NE in the region of Cape Anne.

4.2.1 (b) 4 August - 15 September : Resolute and Cape Charles Yorke

Since Cape Charles Yorke is roughly 390 km to the east of Resolute, we might expect few similarities between the two stations. As seen in Appendix 2, the corrected mean wind speed at Cape Charles Yorke (CCY hereafter) is higher than at Resolute. Both stations show a net flow from the west, but CCY shows a net flow of air from the south compared to a net flow from the north at Resolute. The N-S component is much less variable at CCY than at Resolute, as evidenced by lower values of maximum and minimum N-S component and smaller standard deviation of the N-S component seen at CCY.

Winds at Resolute are most commonly WNW through N, with small peaks at the E/ESE and S directions (the distribution is much the same as during the observation period examined previously). Once again, due to the topographical effect mentioned above, there are very few winds from the SSW through WSW directions. Winds at CCY are nearly absent in all but the ENE/E and SW through W directions. The comparatively large number of SW winds may be responsible for the net southerly flow seen at CCY. These SW winds may be winds blowing out of Admiralty Inlet along the shore of Baffin Island, which runs SW-NE in the vicinity of CCY.

Even with the greater variability of wind direction at Resolute, a similarity is found in the general trends of the E-W components of the two stations, as seen in the time series plots (Figure 8). A reversal in the general E-W flow occurred at both stations, from a flow predominantly from the east prior to late August to a flow predominantly from the west after that time.

4.2.2 Wind Roses

Comparative wind roses are found in Figures 15 through 17. (Recall that the labelled directions under each rose refer to the wind direction at Resolute.) These wind roses compare the wind direction at an outlying station with the wind direction at Resolute, so that topographic effects on Resolute wind, as described in 4.2.1 above, must be kept in mind. Only pairs of records in which both the wind speed at Resolute and at the outlying station were greater than 3 m/s were used in the construction of these figures, so that weak, variable winds which might distort the true picture of wind direction variation have been removed. All analyses cover different periods of time, according to the length of simultaneous data available at each station.

4.2.2 (a) Somerville Island

W and E winds at Resolute are not distorted here, but SE, NE, N and NW winds all appear to be rotated by about 45° in a counter-clockwise direction at Somerville Island. This may be due to the NW-SE bias at Resolute caused by the local topography, as described in 4.2.1 (a) above. South winds at Resolute become E winds at Somerville Island.

4.2.2 (b) Griffith Island

Only NW and N winds are comparatively unaffected at Griffith Island. S, SE and E winds are all deflected to become NE at Griffith Island, and NE winds at Resolute become N at Griffith Island.

4.2.2 (c) Cape Anne

There seems to be a general trend for winds from all directions at Resolute to be deflected by between 22.5° and 45°, in a counter-clockwise direction, at Cape Anne. Exceptions to the trend are : E winds, which are not greatly changed; S winds, which are deflected roughly 90°; and NW winds, which are highly variable.

4.2.2 (d) Rodd Bay

Results here reflect the strongly bi-directional character of Rodd Bay winds described in 4.2.1 (a) above. All winds at Resolute are changed to become either NW or E at Rodd Bay. Thus, only NW winds and E winds are unchanged at Rodd Bay. N and W winds become NW, and S and SE winds become E. NE winds at Resolute are NW at Rodd Bay, which

Figure 15. Comparative Wind Roses - Cape Anne and Rodd Bay.

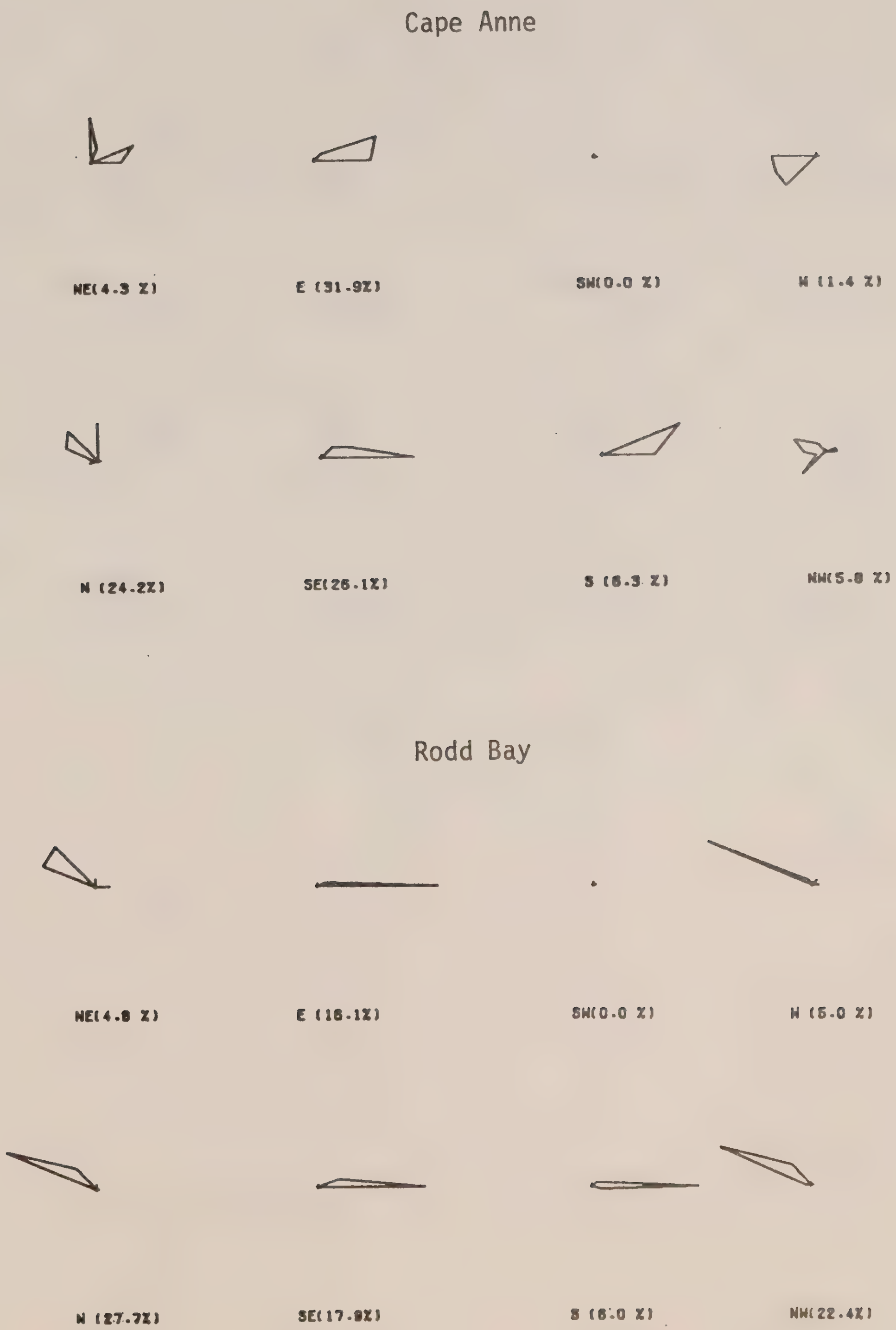


Figure 16. Comparative Wind Roses - Griffith Island and Somerville Island.

Griffith Island

Somerville Island

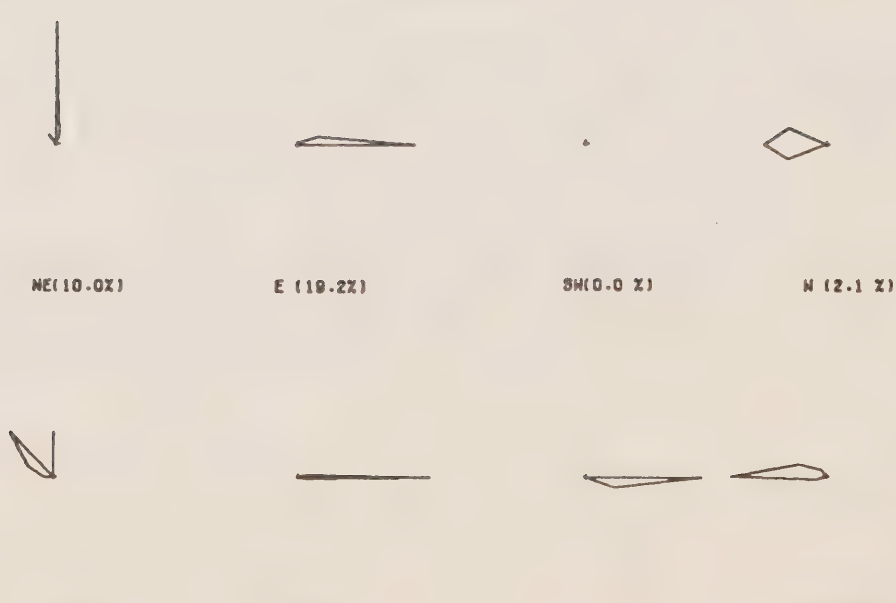
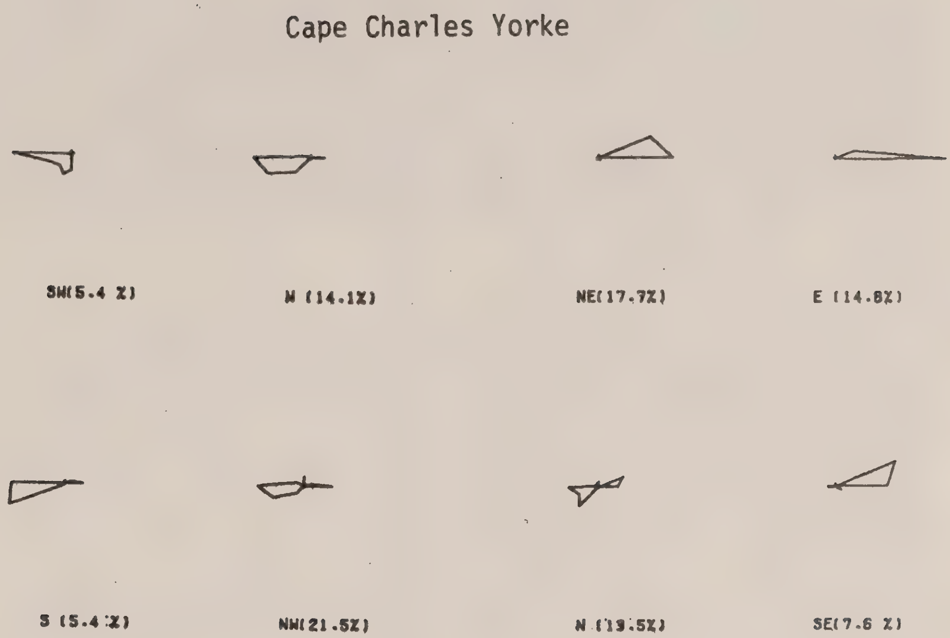


Figure 17. Comparative Wind Roses - Cape Charles Yorke.



is not surprising because NE winds at Resolute are likely to be distorted N winds, as described in 4.2.1 (a) above.

4.2.2 (e) Cape Charles Yorke

Once again the wind roses reflect the strongly bi-directional nature of the winds at Cape Charles Yorke (CCY), which are mostly E and SW through W, as described above in 4.2.1 (b). Thus, winds in those directions at Resolute are largely unchanged at CCY (SW winds tend to be changed to W and S winds at CCY). Northeast winds tend to be deflected toward the E, and SE winds appear to be deflected toward the NE. Northwest and S winds are deflected toward the W. North winds at Resolute appear to become either W/SW or E/NE at CCY.

4.2.3 Linear Regressions

Information from the linear regression analysis is summarized in Table 10. The results are much the same as those presented in 4.2.1 and 4.2.2 above. Correlation of wind speeds of outlying stations to those in Resolute is poor, ranging from a high (r^2 = 0.44) at Somerville Island to a low (r^2 = 0.09) at Cape Charles Yorke. As might be expected, the correlation coefficients decreased with the distance of the predictand station from Resolute. Correlation coefficients of E-W components did not change very much with distance from Resolute, ranging from a high (r^2 = 0.45) at Somerville Island to a low (r^2 = 0.36) at Cape Anne. The correlation coefficients of the N-S component, however, did decrease drastically with distance from Resolute, ranging from a high (r^2 = 0.50) at Somerville Island to a low (r^2 = 0.01) at Cape Charles Yorke; [an exception to this pattern was Rodd Bay (r^2 = 0.37 for the N-S component), but the higher correlation there may be a reflection of the relative lack of a N-S component in winds at Rodd Bay, as described in 4.2.1 and 4.2.2 above]. Thus, variations of the E-W components show more consistency along the length of Parry Channel than variations of the N-S components, as might be expected from the geography of the area.

Significance levels of the regression and the correlation coefficient are virtually all better than 99.9%. Thus, a significant correlation exists between predictor and predictand in all cases, but the typically low values of r^2 indicate that, in most cases, the correlation is not simply linear. Examination of the time series plots of the N and E components of wind velocity (Figures 7 and 8) indicate that, although the correlation of short period variations for any pair of stations is low, longer period variations (periods greater than 3-4 days) might be better correlated, especially in the case of the East components. Lack of correlation at high frequencies is intuitively expected, since phenomena occurring over short temporal scales will usually occur over short spatial scales as well. Further analysis of the data is required to ascertain whether or not low frequency variations of winds in eastern Parry Channel can be adequately predicted from measurements of Resolute surface wind.

Table 10 : Results of Linear regressions of Parry Channel winds on wind at Resolute.

Predictand Station	Speed					N-S Component					E-W Component				
	N	Lag	F-value	r	sig.	N	Lag	F-value	r	sig.	N	Lag	F-value	r	sig.
Somerville Island (W1)	938	+1	721	.660	>>99.9	939	0	919	.704	>>99.9	938	+1	764	.670	>>99.9
Griffith Island (W2)	512	+2	265	.585	>>99.9	514	0	224	.552	>>99.9	513	+1	305	.611	>>99.9
Cape Anne (WP3)	933	+3	154	.377	>>99.9	933	+3	20.2	.552	>99.9	932	+4	527	.601	>>99.9
Rodd Bay (WP4)	864	-5	141	.375	>>99.9	864	-5	505	.608	>>99.9	858	+1	495	.605	>>99.9
Cape Charles Yorke (WP7)	991	-1	92	.292	>>99.9	996	-6	9	-.094	99.0	984	+6	626	.624	>>99.9

Explanation of Abbreviations:- N: number of pairs of observations used in analysis.
Lag: time lag(hours) of best regression found.
r: the correlation coefficient.
sig: significance level (in percent).

4.3 Pressures

Time-series plots of pressure can be seen in Figure 18. Basic statistics of pressure at all stations, over a common time period of 9.5 days from 21 August to 31 August, are given in Table 11.

It was originally planned to collect continuous atmospheric pressure information at stations WP3 (Cape Anne), WP4 (Rodd Bay), P5 (Cape Hurd) and P6 (Cape York) from approximately 12 July until approximately 2 September but, due to a problem with magnetic tapes at these four stations, the first portion of the data (up to approximately 21 August) was lost. In addition, there was an unknown malfunction in the detector at Cape York (see Figure 18). The pressure record there shows large, apparently diurnal fluctuations. These are an artifact, most likely related to diurnal temperature variations, but the exact mechanism by which the apparent pressure changes were brought about remains unclear. Finally, the record at Cape Hurd was quite noisy - 244 records had to be removed during the statistical analysis because they were outside the acceptable range. Thus, the pressure records collected are of only limited use because of the short data period available in most cases, and the unreliability of some records.

The time-series plots indicate that major trends in pressure fluctuations are much the same at all stations, which is to be expected since all stations are within a small geographical area in relation to the typical scale size of synoptic atmospheric systems. There are some obvious differences in the pressure records at Resolute and Cape Charles Yorke; pressure fluctuations at Resolute seem to be larger than at Cape Charles Yorke.

The basic statistics indicate that all stations had lower average pressure than Resolute during the 9.5 day period examined. The average pressure at Cape Charles Yorke during this period was 1012.65 mbar compared with 1016.59 mbar at Resolute, indicating a fairly strong mean geostrophic flow of air from the north during that period. However, the time series of north components of winds (see Figure 7) shows a very weak and variable north component at Cape Charles Yorke, and an only slightly larger north component at Resolute during the period examined.

4.4 Comparison of Geostrophic Winds with actual Recorded Winds

Unfortunately, the available useful pressure data was very limited, so that there was not enough data available for a long-term analysis of the relationship between geostrophic winds and recorded winds. The results presented in Table 12 cover a maximum period of analysis of only 9 full days (from 22 August to 30 August inclusive). The recorded wind at Cape Anne shows a negative correlation to the calculated geostrophic wind (which is essentially northerly) caused by pressure differences between Cape Anne and Rodd Bay. Surprisingly, the correlation is highly significant and the relationship between the two variables is reasonably linear (r^2 = 0.59). Wind measurements were not taken at Rodd Bay during the time of this analysis, so it was not possible to see if the negative correlation existed there also.

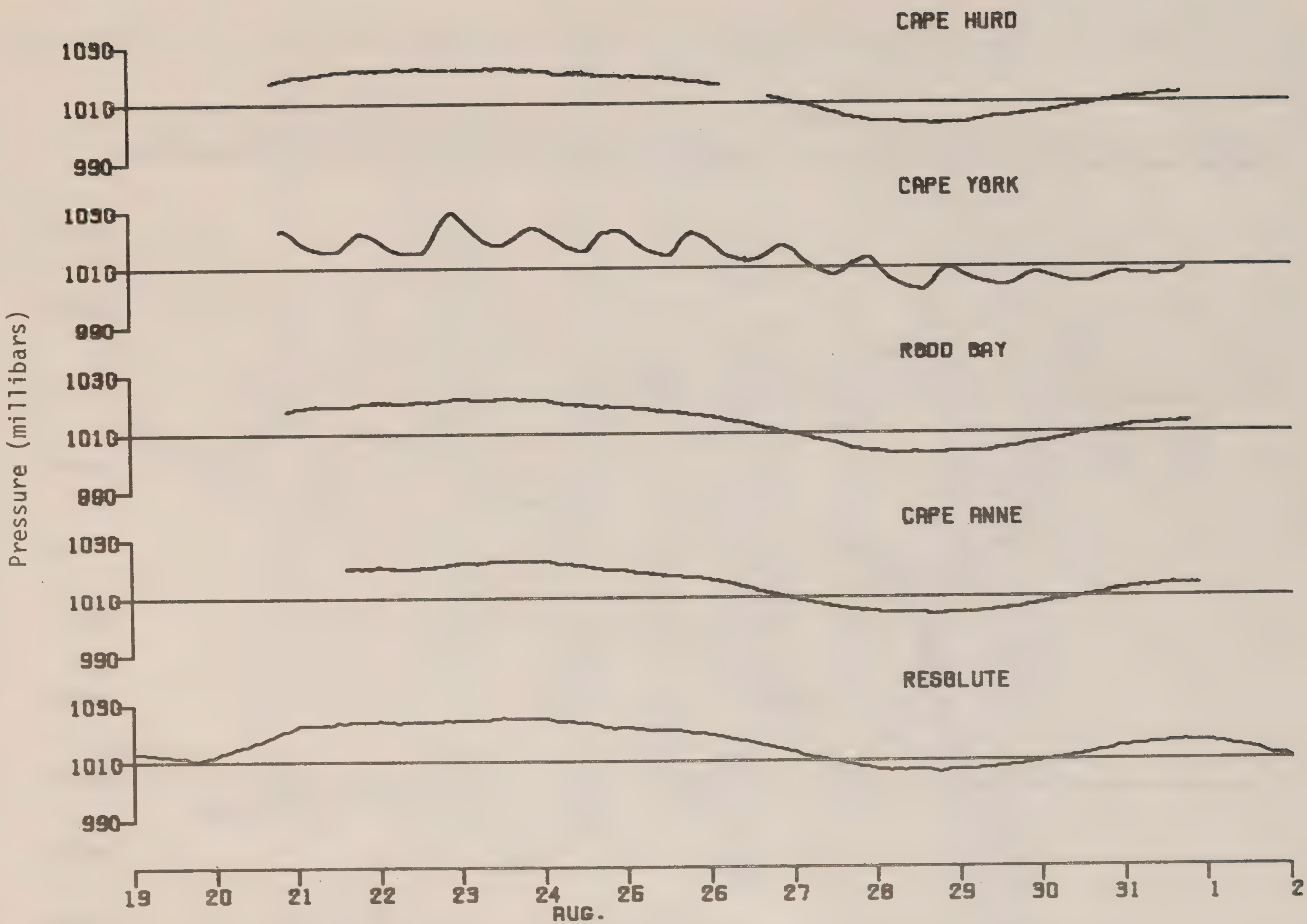


Figure 18. Time series plots of atmospheric pressure (corrected to mean sea level).

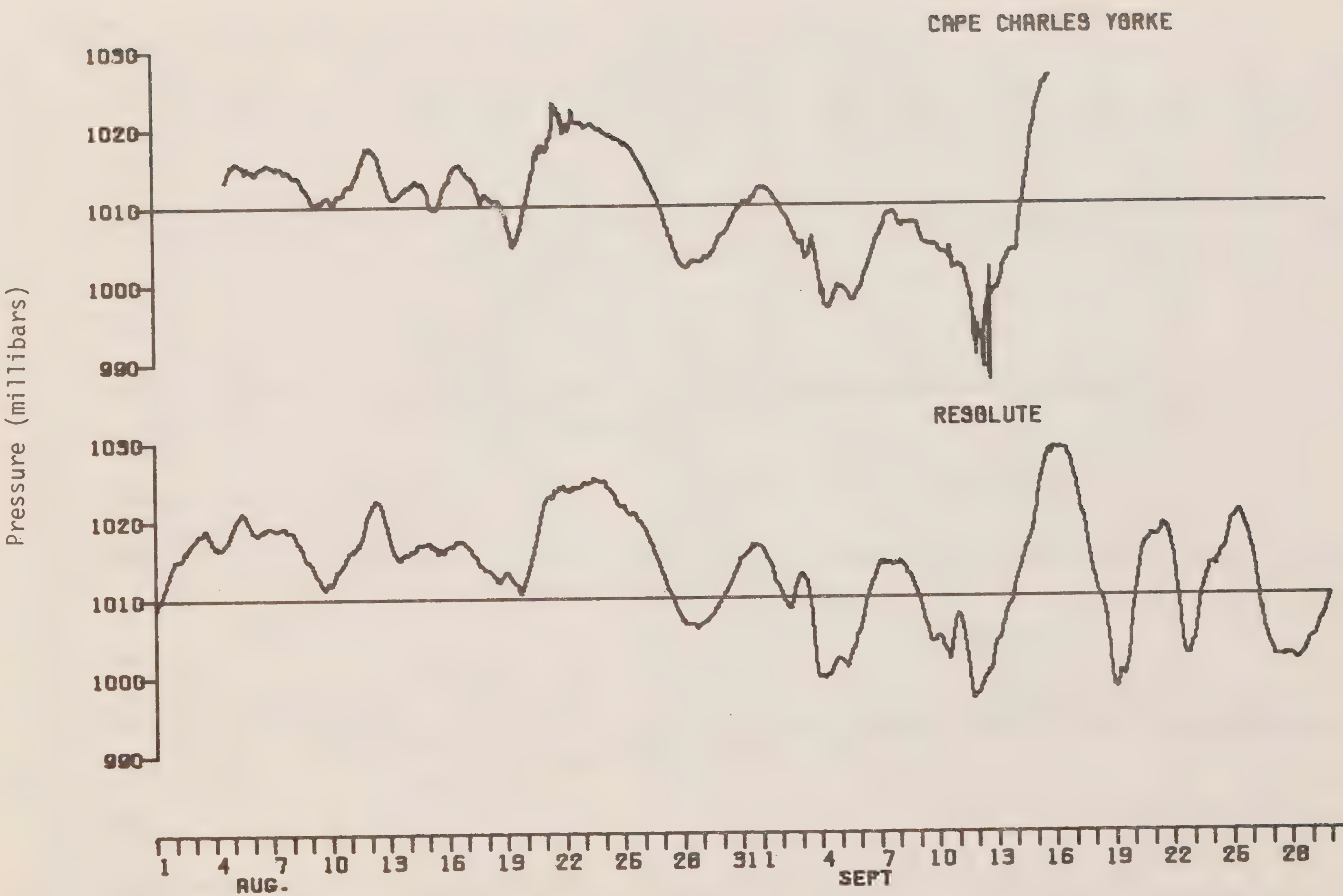


Figure 18.(cont'd). Time series plots of atmospheric pressure (corrected to mean sea level).

Table 11 : Basic statistics of pressures.

STATION: CAPE YORK . INSTRUMENT/TAPE: 105/2
LAT: 73 DEG 54 MIN 0 SEC N. LONG: 87 DEG 0 MIN 0 SEC W.
1824 RECORDS PROCESSED. START TIME: 14:45 HRS GMT, 21/ 8 1977.
RECORDS/HOUR= 8
0 RECORDS WERE OUTSIDE THE RANGE 960 TO 1040 MB. AND WERE DELETED.

PARAMETER	UNITS	MEAN	STD.DEV.	MAX.	MIN.
PRESSURE	MILLIBARS	1015.43	7.14	1030.75	1003.85

STATION: CAPE HURD . INSTRUMENT/TAPE: 106/2
LAT: 74 DEG 31 MIN 42 SEC N. LONG: 90 DEG 0 MIN 0 SEC W.
1824 RECORDS PROCESSED. START TIME: 14:45 HRS GMT, 21/ 8 1977.
RECORDS/HOUR= 8
244 RECORDS WERE OUTSIDE THE RANGE 960 TO 1040 MB. AND WERE DELETED.

PARAMETER	UNITS	MEAN	STD.DEV.	MAX.	MIN.
PRESSURE	MILLIBARS	1014.87	7.74	1024.28	1004.50

STATION: RESOLUTE . INSTRUMENT/TAPE: NONE
LAT: 74 DEG 41 MIN 0 SEC N. LONG: 94 DEG 54 MIN 0 SEC W.
228 RECORDS PROCESSED. START TIME: 14:45 HRS GMT, 21/ 8 1977.
RECORDS/HOUR= 1
0 RECORDS WERE OUTSIDE THE RANGE 960 TO 1040 MB. AND WERE DELETED.

PARAMETER	UNITS	MEAN	STD.DEV.	MAX.	MIN.
PRESSURE	MILLIBARS	1016.59	6.99	1025.40	1006.10

Table 11 (Cont'd) : Basic statistics of pressures.

STATION: C CH YORKE. INSTRUMENT/TAPE: TG21
LAT: 73 DEG 43 MIN 0 SEC N. LONG: 82 DEG 45 MIN 0 SEC W.
456 RECORDS PROCESSED. START TIME: 14:45 HRS GMT, 21/ 8 1977.
RECORDS/HOUR= 2
0 RECORDS WERE OUTSIDE THE RANGE 960 TO 1040 MB. AND WERE DELETED.

PARAMETER	UNITS	MEAN	STD.DEV.	MAX.	MIN.
PRESSURE	MILLIBARS	1012.65	7.21	1023.10	1002.00

STATION: CAPE ANNE . INSTRUMENT/TAPE: 103/2
LAT: 74 DEG 6 MIN 0 SEC N. LONG: 94 DEG 44 MIN 0 SEC W.
1824 RECORDS PROCESSED. START TIME: 14:45 HRS GMT, 21/ 8 1977.
RECORDS/HOUR= 8
0 RECORDS WERE OUTSIDE THE RANGE 960 TO 1040 MB. AND WERE DELETED.

PARAMETER	UNITS	MEAN	STD.DEV.	MAX.	MIN.
PRESSURE	MILLIBARS	1015.58	7.06	1024.74	1005.77

STATION: RODD BAY . INSTRUMENT/TAPE: 104/2
LAT: 73 DEG 55 MIN 30 SEC N. LONG: 90 DEG 18 MIN 0 SEC W.
1824 RECORDS PROCESSED. START TIME: 14:45 HRS GMT, 21/ 8 1977.
RECORDS/HOUR= 8
0 RECORDS WERE OUTSIDE THE RANGE 960 TO 1040 MB. AND WERE DELETED.

PARAMETER	UNITS	MEAN	STD.DEV.	MAX.	MIN.
PRESSURE	MILLIBARS	1015.25	7.33	1024.27	1004.77

Table 12 : Result of regressions of geostrophic winds calculated from pressure differences on recorded winds.

Pressure stations used to calculate geostrophic winds (Predictor)		Geo-strophic wind direction	Wind station (Predictand)	Best Regression					
				Slope	Intercept	N	r	sig	lag
Cape Anne (WP3)	Rodd Bay (WP4)	8.2°	Cape Anne	-0.416	0.981	208	-0.77	>>99.9	+3
Cape Anne	Resolute (YRB)	265.5°	Cape Anne	0.371	8.15	211	0.87	>>99.9	0
Resolute	Cape Anne	85.5°	Resolute	0.445	-9.56	216	0.71	>>99.9	-5

Regressions of both Resolute wind and Cape Anne wind on calculated geostrophic winds (which are essentially easterly or westerly), caused by pressure differences between these two stations, are more reasonable - both are positive regressions and both are highly significant. Winds at Cape Anne are more closely related ($r^2 = 0.76$) to geostrophic winds than are winds at Resolute ($r^2 = 0.50$). A close examination of the regression parameters reveals that, theoretically, in the absence of a N-S pressure gradient between these two stations (i.e. the calculated geostrophic wind is zero), a strong residual flow of air from the west persists at both stations. This flow, if it is real, presumably arises through some mechanism other than geostrophic flow. It is also possible that the residual flow is an artifact caused by errors in the absolute pressure difference between these two stations. It has been mentioned previously (3.2 above) that problems were encountered in the calibration of the pressure gauges due to apparent temperature sensitivity of the pressure sensors. Thus, errors in the absolute pressures measured by these gauges (i.e. at Cape Anne) might occur, and a simple calculation reveals that an error of 2.38 mbar in the absolute pressure difference between Resolute and Cape Anne would, almost completely, account for the residual flow at both stations.

5. SUMMARY

The direction distribution of winds at Resolute during the period of this study was typical of the ten-year averages. Winds in eastern Barrow Strait (Rodd Bay) and Lancaster Sound (Cape Charles Yorke) tend to be strongly bi-directional in character - few winds are found with directions outside the E and W quadrants. Winds in the central Barrow Strait region are more variable in direction. A reversal of the E - W wind component, from predominantly easterly to westerly wind directions, occurred throughout the region in late August. Power spectra indicate that the highest spectral levels were found at the lowest resolvable frequencies, and no significant activity at the diurnal or semi-diurnal frequencies was found. Most stations (excluding Resolute and Griffith Island) showed larger spectral levels at low frequencies for the E - W component than for the N - S component.

Winds at Resolute become less representative of local winds as distance from Resolute increases. Comparison of winds at Somerville Island (33 km from Resolute) with those at Resolute indicate that the wind field at Resolute may be strongly influenced by local topographic features. Wind speeds at Resolute are generally higher than those observed at other stations in the study area, with the exception of Cape Charles Yorke and Griffith Island. Statistical analysis indicates that the correlation between Resolute winds and those in eastern Parry Channel decreases rapidly as the distance from Resolute increases, and that E - W components correlate much better than do N - S components. Examination of the time series plots of the wind components suggests that, for longer-period (greater than approx. 3-4 days) wind variations, the surface wind at Resolute may be a useful predictor of simultaneous winds in eastern Parry Channel, particularly if the influence of the local topography at both Resolute and the predictand site are taken into account. Further analysis of the data set seems warranted to determine both the relevant frequency range and reliability of such predictions, should they be possible.

It should be noted that the data presented in this report are of limited usefulness in predicting or assessing weather conditions over open water in the study region, simply because all the stations sampled are at shoreline, or even inshore locations, and thus measurements taken are not truly representative of conditions over water.

Atmospheric pressure information was limited to a measurement period of 9 days, but significant correlations were found between recorded winds at Cape Anne and Resolute and the calculated geostrophic wind caused by pressure differences between those two stations.

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Appendix 1A : Basic statistics - winds.

STATION: GRIFFITHS . INSTRUMENT/TAPE: 74/1
LAT: 74 DEG 31 MIN 0 SEC N. LONG: 95 DEG 10 MIN 0 SEC W.
1032 RECORDS PROCESSED. START TIME: 3: 0 HRS GMT, 19/ 7 1977.
RECORDS/HOUR= 2

PARAMETER	UNITS	MEAN	STD.DEV.	MAX.	MIN.
SPEED	METERS/SEC	5.64	3.30	14.01	.54
N-S COMPONENT	METERS/SEC	3.99	3.33	13.86	-4.54
E-W COMPONENT	METERS/SEC	-.47	3.94	12.42	-8.34

STATION: RESOLUTE. INSTRUMENT/TAPE NONE
LAT: 74 DEG 41 MIN 0 SEC N. LONG: 94 DEG 54 MIN 0 SEC W.
2160 RECORDS PROCESSED. START TIME: 7: 0 HRS GMT, 1/ 7 1977.
RECORDS/HOUR= 1

PARAMETER	UNITS	MEAN	STD.DEV.	MAX.	MIN.
SPEED	METERS/SEC	5.00	3.12	15.64	.00
N-S COMPONENT	METERS/SEC	1.05	3.94	14.70	-10.84
E-W COMPONENT	METERS/SEC	.14	4.25	15.41	-13.44

STATION: C. Chas. Yorke INSTRUMENT/TAPE:
LAT: 73 DEG 43 MIN 0 SEC N. LONG: 82 DEG 45 MIN 0 SEC W.
2016 RECORDS PROCESSED. START TIME: 18: 0 HRS GMT, 4/ 8 1977.
RECORDS/HOUR= 2

PARAMETER	UNITS	MEAN	STD.DEV.	MAX.	MIN.
SPEED	METERS/SEC	4.99	2.22	12.92	.30
N-S COMPONENT	METERS/SEC	-.49	1.94	4.15	-7.48
E-W COMPONENT	METERS/SEC	-.24	5.07	12.72	-10.53

STATION: RODD BAY. INSTRUMENT/TAPE: 77/1
LAT: 73 DEG 55 MIN 30 SEC N. LONG: [illegible]0 DEG 18 MIN 0 SEC W.
3480 RECORDS PROCESSED. START TIME: 17: 0 HRS GMT, 10/ 7 1977.
RECORDS/HOUR= 4

PARAMETER	UNITS	MEAN	STD.DEV.	MAX.	MIN.
SPEED	METERS/SEC	3.66	2.51	11.43	.00
N-S COMPONENT	METERS/SEC	1.11	1.40	6.94	-4.55
E-W COMPONENT	METERS/SEC	-.21	4.06	11.43	-9.66

STATION: CAPE ANNE. INSTRUMENT/TAPE: 78/1
LAT: 74 DEG 6 MIN 0 SEC N. LONG: 94 DEG 44 MIN 0 SEC W.
3792 RECORDS PROCESSED. START TIME: 19: 0 HRS GMT, 9/ 7 1977.
RECORDS/HOUR= 4

PARAMETER	UNITS	MEAN	STD.DEV.	MAX.	MIN.
SPEED	METERS/SEC	2.38	1.50	10.42	.00
N-S COMPONENT	METERS/SEC	.23	1.32	7.37	-5.04
E-W COMPONENT	METERS/SEC	.61	2.39	7.15	-7.97

STATION: S,VILLE IS. INSTRUMENT/TAPE: 75/1
LAT: 74 DEG 44 MIN 0 SEC N. LONG: 96 DEG 10 MIN 0 SEC W.
3792 RECORDS PROCESSED. START TIME: 0: 0 HRS GMT, 10/ 7 1977.
RECORDS/HOUR= 4

PARAMETER	UNITS	MEAN	STD.DEV.	MAX.	MIN.
SPEED	METERS/SEC	2.88	2.23	11.12	.23
N-S COMPONENT	METERS/SEC	.89	1.65	9.36	-2.90
E-W COMPONENT	METERS/SEC	-.04	3.13	11.12	-8.44

Appendix 1B : Joint frequency distributions of wind speed and direction

PROGRAM: BARROW STRAIT WINDS STATION: RESOLUTE

WIND RECORDS FROM 91 DAYS STARTING AT 7:00 HRS GMT ON 1/ 7, 1977 WERE EXAMINED.
2184 MEASUREMENTS WERE PROCESSED IN THIS ANALYSIS.

SPEED CLASS(M/SEC)

		0- 2	2- 4	4- 6	6- 8	8- 10	10- 12	12- 14	14- 16	16- 18	18- 20	20- 22	22- 24	24- INF	TOTAL
	N :	103	32	32	27	27	15	5	2	0	0	0	0	0*	243
W	NNE :	7	16	34	21	23	6	2	0	0	0	0	0	0*	109
I	NE :	5	8	22	15	9	9	10	2	0	0	0	0	0*	80
N	ENE :	10	10	29	13	10	0	1	0	0	0	0	0	0*	73
D	E :	10	27	39	30	24	9	15	3	0	0	0	0	0*	157
	ESE :	12	26	57	36	27	9	10	1	0	0	0	0	0*	178
D	SE :	25	44	36	21	6	3	5	0	0	0	0	0	0*	140
I	SSE :	32	38	21	4	1	0	0	0	0	0	0	0	0*	96
R	S :	46	46	34	20	12	1	0	0	0	0	0	0	0*	159
E	SSW :	11	11	14	8	7	3	1	0	0	0	0	0	0*	55
C	SW :	8	9	24	2	5	0	0	0	0	0	0	0	0*	48
T	WSW :	8	10	8	6	4	0	0	0	0	0	0	0	0*	36
I	W :	28	23	27	19	8	11	5	0	0	0	0	0	0*	121
O	WNW :	15	85	50	11	19	8	5	1	0	0	0	0	0*	194
N	NW :	18	96	76	35	25	9	2	0	0	0	0	0	0*	261
	NNW :	26	77	44	45	30	8	3	1	0	0	0	0	0*	234
	TOTAL :	364	558	547	313	237	91	64	10	0	0	0	0	0*	2184

DIRECTION/SPEED CLASS HISTOGRAMS OF WIND VELOCITY

PROGRAM: RADAR STATION: GRIFFITHS

WIND RECORDS FROM 21 DAYS STARTING AT 6:00 HRS GMT ON 19/ 7, 1977 WERE EXAMINED.
1008 MEASUREMENTS WERE PROCESSED IN THIS ANALYSIS.

SPEED CLASS(M/SEC)

		0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-22	22-24	24-INF	TOTAL
	N :	15	43	23	3	17	12	18	0	0	0	0	0	0*	131
W	NNE :	10	32	21	5	1	11	2	0	0	0	0	0	0*	82
I	NE :	15	29	30	42	16	0	15	1	0	0	0	0	0*	148
N	ENE :	3	8	29	11	5	0	10	0	0	0	0	0	0*	66
D	E :	2	1	5	1	2	1	0	0	0	0	0	0	0*	12
	ESE :	0	0	0	3	0	0	0	0	0	0	0	0	0*	3
D	SE :	1	0	0	2	0	0	0	0	0	0	0	0	0*	3
I	SSE :	1	0	0	0	0	0	0	0	0	0	0	0	0*	1
R	S :	4	0	0	0	0	0	0	0	0	0	0	0	0*	4
E	SSW :	2	1	0	0	0	0	0	0	0	0	0	0	0*	3
C	SW :	4	7	0	0	0	0	0	0	0	0	0	0	0*	11
T	WSW :	0	16	15	0	1	0	0	0	0	0	0	0	0*	32
I	W :	3	11	6	5	0	0	0	0	0	0	0	0	0*	25
O	WNW :	7	12	26	27	5	0	0	0	0	0	0	0	0*	77
N	NW :	22	27	71	16	23	21	6	0	0	0	0	0	0*	186
	NNW :	67	19	45	22	38	24	9	0	0	0	0	0	0*	224
	TOTAL :	156	206	271	137	108	69	60	1	0	0	0	0	0*	1008

DIRECTION/SPEED CLASS HISTOGRAMS OF WIND VELOCITY

PROGRAM: BRAINCON WIND DATA (DREP) STATION: S,VILLE IS

WIND RECORDS FROM 39 DAYS STARTING AT 0:00 HRS GMT ON 10/ 7, 1977 WERE EXAMINED.
3744 MEASUREMENTS WERE PROCESSED IN THIS ANALYSIS.

SPEED CLASS(M/SEC)

		0- 2	2- 4	4- 6	6- 8	8- 10	10- 12	12- 14	14- 16	16- 18	18- 20	20- 22	22- 24	24- INF	TOT AL
	N :	98	37	20	21	0	0	0	0	0	0	0	0	0*	176
W	NNE :	77	23	1	0	0	0	0	0	0	0	0	0	0*	101
I	NE :	96	12	4	0	0	0	0	0	0	0	0	0	0*	112
N	ENE :	155	65	28	3	0	0	0	0	0	0	0	0	0*	251
D	E :	127	140	243	204	19	3	0	0	0	0	0	0	0*	736
	ESE :	53	16	27	17	0	0	0	0	0	0	0	0	0*	113
D	SE :	30	14	0	0	0	0	0	0	0	0	0	0	0*	44
I	SSE :	27	1	0	0	0	0	0	0	0	0	0	0	0*	28
R	S :	17	0	0	0	0	0	0	0	0	0	0	0	0*	17
E	SSW :	35	0	0	0	0	0	0	0	0	0	0	0	0*	35
C	SW :	64	0	0	0	0	0	0	0	0	0	0	0	0*	64
T	WSW :	80	48	24	1	0	0	0	0	0	0	0	0	0*	153
I	W :	166	128	123	24	4	0	0	0	0	0	0	0	0*	445
O	WNW :	226	135	60	28	5	0	0	0	0	0	0	0	0*	454
N	NW :	219	147	59	57	19	0	0	0	0	0	0	0	0*	501
	NNW :	198	169	78	60	9	0	0	0	0	0	0	0	0*	514
	TOTAL :	1608	935	667	415	56	3	0	0	0	0	0	0	0*	3744

DIRECTION/SPEED CLASS HISTOGRAMS OF WIND VELOCITY

PROGRAM: BRAINCON WIND DATA (DREP) STATION: CAPE ANNE

WIND RECORDS FROM 39 DAYS STARTING AT 19:00 HRS GMT ON 9/ 7, 1977 WERE EXAMINED.
3744 MEASUREMENTS WERE PROCESSED IN THIS ANALYSIS.

SPEED CLASS(M/SEC)

		0- 2	2- 4	4- 6	6- 8	8- 10	10- 12	12- 14	14- 16	16- 18	18- 20	20- 22	22- 24	24- INF	TOTAL
	N :	38	29	5	0	0	0	0	0	0	0	0	0	0*	72
W	NNE :	62	10	0	0	0	0	0	0	0	0	0	0	0*	72
I	NE :	112	49	58	3	0	0	0	0	0	0	0	0	0*	222
N	ENE :	385	413	53	0	0	0	0	0	0	0	0	0	0*	851
D	E :	179	486	181	11	0	0	0	0	0	0	0	0	0*	857
	ESE :	15	37	17	0	0	0	0	0	0	0	0	0	0*	69
D	SE :	3	3	5	0	0	0	0	0	0	0	0	0	0*	11
I	SSE :	10	4	7	0	0	0	0	0	0	0	0	0	0*	21
R	S :	3	3	2	0	0	0	0	0	0	0	0	0	0*	8
E	SSW :	22	3	0	0	0	0	0	0	0	0	0	0	0*	25
C	SW :	303	285	1	0	0	0	0	0	0	0	0	0	0*	589
T	WSW :	354	114	10	0	0	0	0	0	0	0	0	0	0*	478
I	W :	60	43	13	6	0	0	0	0	0	0	0	0	0*	122
O	WNW :	38	70	13	13	1	0	0	0	0	0	0	0	0*	135
N	NW :	42	19	18	24	23	1	0	0	0	0	0	0	0*	127
	NNW :	30	23	32	0	0	0	0	0	0	0	0	0	0*	85
	TOTAL :	1656	1591	415	57	24	1	0	0	0	0	0	0	0*	3744

DIRECTION/SPEED CLASS HISTOGRAMS OF WIND VELOCITY

PROGRAM: BRAINCON WIND DATA (DREP) STATION: RODD BAY

WIND RECORDS FROM 36 DAYS STARTING AT 17:00 HRS GMT ON 10/ 7, 1977 WERE EXAMINED.
3456 MEASUREMENTS WERE PROCESSED IN THIS ANALYSIS.

SPEED CLASS(M/SEC)

		0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-22	22-24	24-INF	TOTAL
	N :	79	8	2	0	0	0	0	0	0	0	0	0	0*	89
W	NNE :	54	11	1	0	0	0	0	0	0	0	0	0	0*	66
I	NE :	68	44	24	0	0	0	0	0	0	0	0	0	0*	136
N	ENE :	152	158	52	7	0	0	0	0	0	0	0	0	0*	369
D	E :	95	247	306	171	38	7	0	0	0	0	0	0	0*	864
	ESE :	23	49	7	1	0	0	0	0	0	0	0	0	0*	80
D	SE :	3	0	0	0	0	0	0	0	0	0	0	0	0*	3
I	SSE :	2	7	0	0	0	0	0	0	0	0	0	0	0*	9
R	S :	11	21	3	0	0	0	0	0	0	0	0	0	0*	35
E	SSW :	11	7	0	0	0	0	0	0	0	0	0	0	0*	18
C	SW :	20	0	0	0	0	0	0	0	0	0	0	0	0*	20
T	WSW :	6	0	0	0	0	0	0	0	0	0	0	0	0*	6
I	W :	31	20	29	8	2	0	0	0	0	0	0	0	0*	90
O	WNW :	145	181	239	316	82	2	0	0	0	0	0	0	0*	965
N	NW :	247	136	92	52	13	0	0	0	0	0	0	0	0*	540
	NNW :	131	23	8	3	1	0	0	0	0	0	0	0	0*	166
	TOTAL :	1078	912	763	558	136	9	0	0	0	0	0	0	0*	3456

DIRECTION/SPEED CLASS HISTOGRAMS OF WIND VELOCITY

PROGRAM: LANCASTER SOUND PROJECT   STATION: Cape Charles Yorke

WIND RECORDS FROM 42 DAYS STARTING AT 18:00 HRS GMT ON 4/ 8, 1977 WERE EXAMINED.
2016 MEASUREMENTS WERE PROCESSED IN THIS ANALYSIS.

SPEED CLASS(M/SEC)

		0- 2	2- 4	4- 6	6- 8	8- 10	10- 12	12- 14	14- 16	16- 18	18- 20	20- 22	22- 24	24- INF	TOTAL
	N :	5	11	1	0	0	0	0	0	0	0	0	0	0*	17
W	NNE :	7	4	0	0	0	0	0	0	0	0	0	0	0*	11
I	NE :	11	13	1	0	0	0	0	0	0	0	0	0	0*	25
N	ENE :	16	46	90	71	22	9	0	0	0	0	0	0	0*	254
D	E :	26	133	302	96	10	3	2	0	0	0	0	0	0*	572
	ESE :	17	29	5	1	0	0	0	0	0	0	0	0	0*	52
D	SE :	14	3	4	0	0	0	0	0	0	0	0	0	0*	21
I	SSE :	7	7	4	3	0	0	0	0	0	0	0	0	0*	21
R	S :	18	21	8	6	0	0	0	0	0	0	0	0	0*	53
E	SSW :	7	26	11	6	1	0	0	0	0	0	0	0	0*	51
C	SW :	12	63	80	29	35	6	0	0	0	0	0	0	0*	225
T	WSW :	5	77	59	74	35	10	0	0	0	0	0	0	0*	260
I	W :	13	45	99	114	74	2	0	0	0	0	0	0	0*	347
O	WNW :	9	22	16	13	5	0	0	0	0	0	0	0	0*	65
N	NW :	11	7	2	1	0	0	0	0	0	0	0	0	0*	21
	NNW :	10	9	2	0	0	0	0	0	0	0	0	0	0*	21
	TOTAL :	188	516	684	414	182	30	2	0	0	0	0	0	0*	2016

APPENDIX 2. CORRECTION OF WIND SPEEDS TO THE STANDARD 10 m ANEMOMETER LEVEL.

For a neutral atmosphere, the vertical gradient in the mean wind speed ($\bar{u}$) is inversely proportional to the distance above the ground (Z) with the following relationship (Businger, 1973) :

$$\frac{\partial \bar{u}}{\partial Z} = \frac{(\tau/\rho)^{\frac{1}{2}}}{KZ} \quad \ldots \quad \ldots \quad \ldots \quad (1)$$

where K = 0.35 is von Kármán constant
τ is the wind stress, and
ρ is the density of air (1.25×10^{-3} gm/cm^3)

Integrating equation (1) yields

$$\bar{u} = \frac{(\tau/\rho)^{\frac{1}{2}}}{K} \ln Z + C \quad \ldots \quad \ldots \quad \ldots \quad (2)$$

where C is an integration constant.

For the case where $Z = 10$ m, $\bar{u} = \bar{u}_{10}$

$$C = \bar{u}_{10} - \frac{(\tau/\rho)^{\frac{1}{2}}}{K} \ln (10) \quad \ldots \quad \ldots \quad (3)$$

Therefore, equation (2) becomes

$$\bar{u}_{10} = \bar{u} - \frac{(\tau/\rho)^{\frac{1}{2}}}{K} \ln (Z/10) \quad \ldots \quad \ldots \quad (4)$$

Making use of the bulk drag coefficient, C_D

$$\tau = \rho C_D \bar{u}^2$$

Equation (4) can then be rewritten as

$$\bar{u}_{10} = \bar{u}\left[1 - \frac{\sqrt{C_D}}{K} \ln (Z/10)\right] \quad \ldots \quad \ldots \quad (5)$$

Over water, a good approximation for the drag coefficient is $C_D = 1.5 \times 10^{-3}$ (Pond, 1973). The correction factor (k) for each station in the study is

$$\bar{u}_{10} = k \cdot \bar{u}$$

where $k = 1 - 0.11 \cdot \ln (Z/10)$

Stations	z (m)	k	u (m/s)	u_{10} (m/s)
Somerville Island	3	1.13	3.18	3.59
Cape Anne	3	1.13	2.46	2.78
Rodd Bay	3	1.13	3.78	4.27
Griffith Island	8	1.02	5.64	5.75
Resolute (21.5 days)	12	0.98	4.83	4.73
Resolute (42 days)	12	0.98	4.56	4.47
Cape Charles Yorke	4	1.10	4.99	5.49

Pacific Marine Science Report 78-22

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1978

ABSTRACT

This report describes the achievements and pitfalls in transferring synchronized Loran-C time of arrival measurements from inland transmitters to the coast of British Columbia. A helicopter and a truck were used to transport Loran-C rho-rho monitor equipment. Loran-C propagation travel times were measured and phase lags were derived from these measurements.

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Lt. W. de George	U.S.C.G., George, Washington
Mr. R. Melby	N.O.S., Seattle
Mr. E. Schening	C.C.G., Telecom, Ottawa
Mr. B. Davies	C.C.G., Telecom, Ottawa
Mr. J. Rennie	C.C.G., Telecom, Ottawa
Mr. B. Deane	Station Manager, Williams Lake
Mr. T. Kew	C.C.G., Vancouver
Mr. J. Howard	D.O.C., Vancouver
Mr. R. Baker	C.C.R.S., Ottawa

LIST OF FIGURES

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INTRODUCTION

One aim of the calibration of the West Canadian Loran-C Chain was to infer the effective impedance of the land path from the transmitter to the service area by making radio wave travel time measurements over known distances along radials from the transmitters. The method is to:

1) Synchronize the Loran-C rho-rho receiver at a point of known coordinates close to the transmitter, at some 20-50 km distance, finding the synchronization constant Δt from $\Delta t = \frac{1}{v} \Delta d$ (Δd is small so that errors of v have small effect on Δt).

2) Move to a coordinated point far from the transmitter, at several hundred km distance, and measure the travel time of the radio wave to that point. Find the mean velocity from $v = \frac{D}{T}$ (D and T are both large so that v is accurately determined).

3) Select reasonable values for conductivity and permittivity, defining impedance, that produce this velocity when used in Johler's equations (Reference 1).

This value of impedance can then be used to predict the "Additional Secondary Correction" over land propagation paths that have similar geology and topography.

HELICOPTER OPERATIONS

A Canadian Coast Guard (C.C.G.) helicopter was used to make the first set of travel time measurements between the transmitters at Williams Lake, B.C. and George, Washington, and the coast. Being able to fly from the coast to the interior minimized the time spent travelling and made access to remote mountain top monitor sites easy.

EQUIPMENT

The following equipment was installed in a Bell 212 helicopter:

1 United States Coast Guard Loran-C Monitor System consisting of:

- 1 Austron 5000 Monitor Receiver
- 1 PDP 8 e computer
- 1 5062C Cesium Frequency Standard
- 1 5061A Cesium Frequency Standard
- 1 Phase Comparator and strip chart recorder
- 1 Uninterruptable Power Supply Unit
- 6 Static Inverters
- 1 Silent 700 Data Terminal
- 1 9-ft. whip antenna c/w with base.

1 3.5 Kilowatt Gas-Powered Generator.

These instruments were fitted in two shock mounted racks placed between the passenger seats and the pilot and engineer. When airborne, electric power

was supplied from the helicopter's 28 volt (D.C.) system. The Loran-C equipment drew more than 90 amps and it was necessary to rig forced air ventilation to cool the inverters that provided the 110 volt (A.C.) power. When monitoring on the ground power was supplied by a 3.5 kilowatt generator.

FIELD WORK

The equipment was fitted in the C.C.G. helicopter on March 3rd, 1977, and a test flight made the next day. On March 5th (day 64), the first set of travel time measurements was started at survey station BOLE on the Institute of Ocean Sciences, Patricia Bay (I.O.S.P.B.) wharf. The helicopter then left for Williams Lake. Although synchronization was maintained during the trip; problems were experienced with excessive signal strength on arrival at Williams Lake, probably due to the antenna configuration or to grounding. It was not possible to re-acquire the signal and synchronization was lost.

Eventually synchronization was re-established at a geodetic station on Mount Alex Graham. Measurements were also made at an alternate site, Meldrum Creek and at Williams Lake Airport. After two full days in the Williams Lake area, the helicopter returned to Victoria, maintaining synchronization en route, thus establishing the travel time of a Loran-C pulse to Patricia Bay (station BOLE).

To measure the travel times to George, Washington, synchronization was re-established at Patricia Bay. The helicopter left for Wenatchee on March 9th. A night was spent in Seattle waiting for the weather to clear in the mountains. Synchronization was maintained throughout this part of the operation and travel times were measured in both directions. Lt. R. Armstrong, U.S.C.G., accompanied the party when in the Wenatchee area.

The T.O.A. measurements were made with a whip antenna placed at the station, connected to the helicopter installation by a long (up to 200 ft) length of Twinnax shielded cable. In order to maintain synchronization the following take-off routine was established:

1) clamp the gain on the receiver,
2) halt the computer,
3) switch to helicopter power from shore and auxiliary power (the U.P.S. maintains continuous power to the receiver),
4) restart the computer within 5 minutes of halting it,
5) remove gain clamps, re-acquire signal,
6) note T.O.A. to check synchronization,
7) clamp the gain on the receiver for the flight,
8) take in the antenna and auxiliary generator, and,
9) up, up and away.

This elaborate routine was necessary as the 1500 v.a. U.P.S. failed at Williams Lake and was replaced by a 500 v.a. U.P.S. generously lent by the station manager at the transmitter. Only the receiver and not the computer could be supplied with continuous power from the 500 v.a. U.P.S.

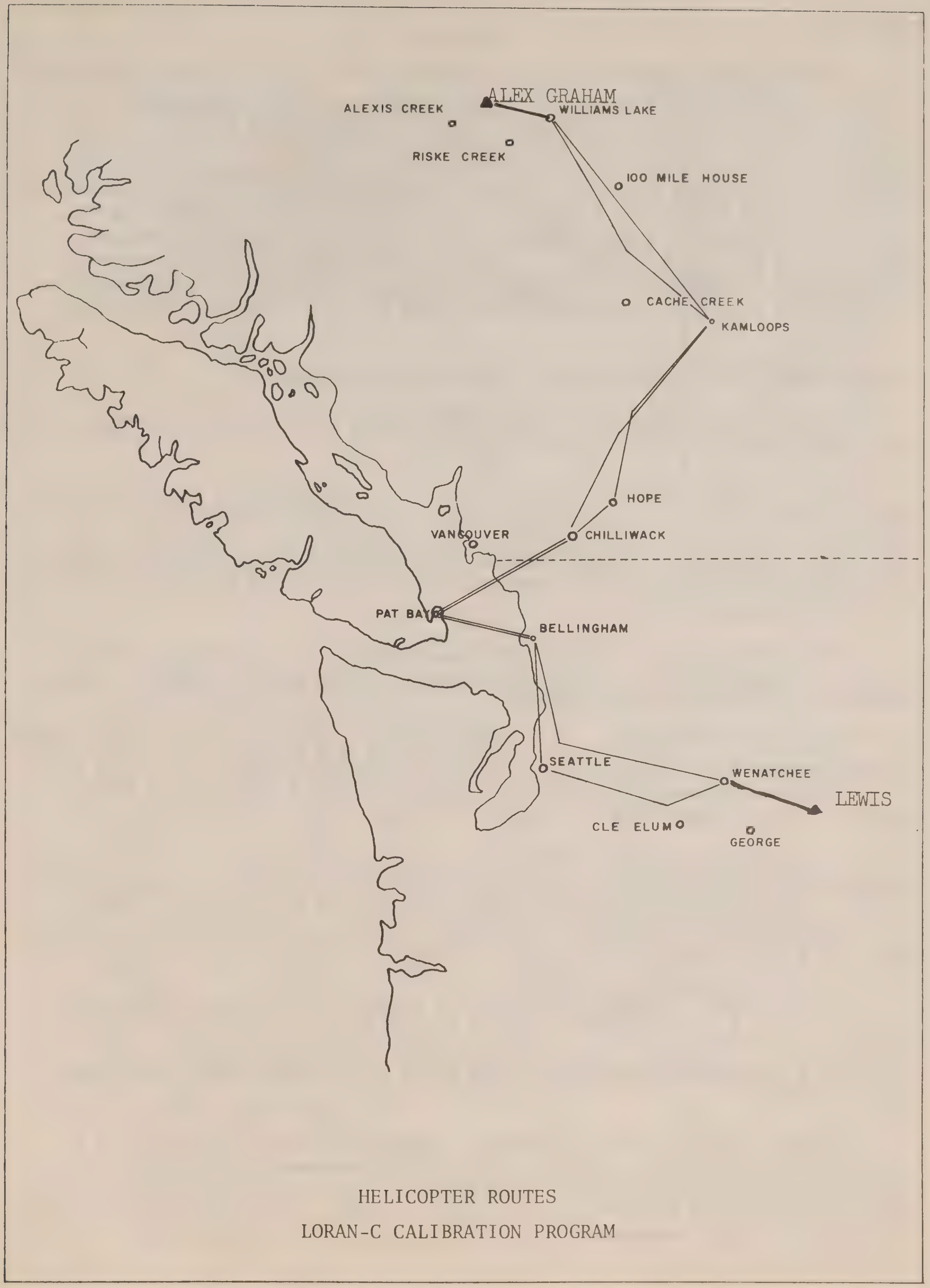

ALEX GRAHAM
ALEXIS CREEK
WILLIAMS LAKE
RISKE CREEK
100 MILE HOUSE
CACHE CREEK
KAMLOOPS
HOPE
CHILLIWACK
VANCOUVER
PAT BAY
BELLINGHAM
SEATTLE
WENATCHEE
LEWIS
CLE ELUM
GEORGE
HELICOPTER ROUTES
LORAN-C CALIBRATION PROGRAM

Figure 1

PROCEDURE

The operating procedure was to land some 20 m away from the known point (usually a geodetic marker) at which we intended to measure the Time of Arrival (T.O.A.); set an 8' whip antenna with Austron base coupler on a plywood board on top of the marker; and connect to the Austron system in the helicopter through about 100 m total length of Twinnax antenna lead. The balance of the lead-in over that needed to reach the antenna was coiled on a reel of about 20 cm. After allowing the Austron to reach a steady reading and then recording for about twenty minutes, we disconnected the antenna, reeled in the Twinnax and flew to the next observation point. The receiver and frequency standard were kept "hot" in order to maintain synchronization, but there was no point in trying to track the Loran-C signals while flying.

EFFECT OF HORIZONTAL ANTENNA LEAD-IN ON PHASE MEASUREMENTS

We observed at geodetic station LEWIS, some 30 km from the George, Washington transmitter, on 10 March 1977.

After taking readings on top of the marker we moved the antenna 200 ft. (60 m) towards the transmitter, expecting to see the correspondong 0.2 μs decrease in T.O.A.; instead the reading increased by 4.3 μs, and the cycle number went from 3.00 to 3.26. When we replaced the antenna on the geodetic marker, this time with 200' of Twinnax unreeled and snaked out on the ground, the reading was unstable.

The following day, 11 March 1977, we made four sets of measurements with the antenna lead in various directions relative to the direction of the transmitter, to explore this problem.

Three sets were observed at Pangburn Field and Lewis, about 50 and 30 km respectively from the Y slave transmitter at George, Washington, and the fourth set was observed at Patricia Bay, B.C., 300 km further away. These observations are summarized in Figures 2 - 5 and Tables 1 - 4.

At the close-to points the T.O.A. reading increased by up to 5 μs when the antenna lead was laid out towards the transmitter, (but not exactly half a cycle); at the distant point the change was only 0.1 μs. But in every case the reading increased when the antenna was moved towards the transmitter where the T.O.A. should in fact have decreased.

In conclusion, readings taken with a remote ship antenna connected to the receiver by a long shielded lead-in are unreliable, particularly when close to the transmitter. Two possible explanations are that the lead-in is acting as a sleeve antenna; and/or that it is re-radiating the signal back into the whip.

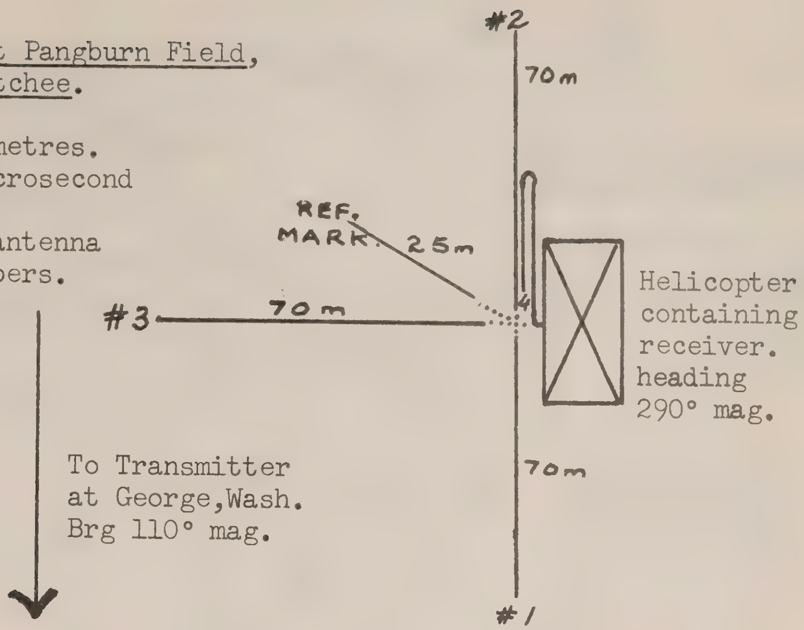
Various solutions were considered, including changing from a whip to a loop antenna, or using a coupler with gain to increase the strength of the signal from the whip compared with any signal that might be picked up by the lead-in. Finally we settled on the safest solution, and mounted the receiver in a van with a whip antenna on the roof, as central as possible and

FIGURE 2

<u>Measurements at Pangburn Field, Wenatchee.</u>

Distances in metres.
30m = 0.1 microsecond

#1 to 4 are antenna position numbers.



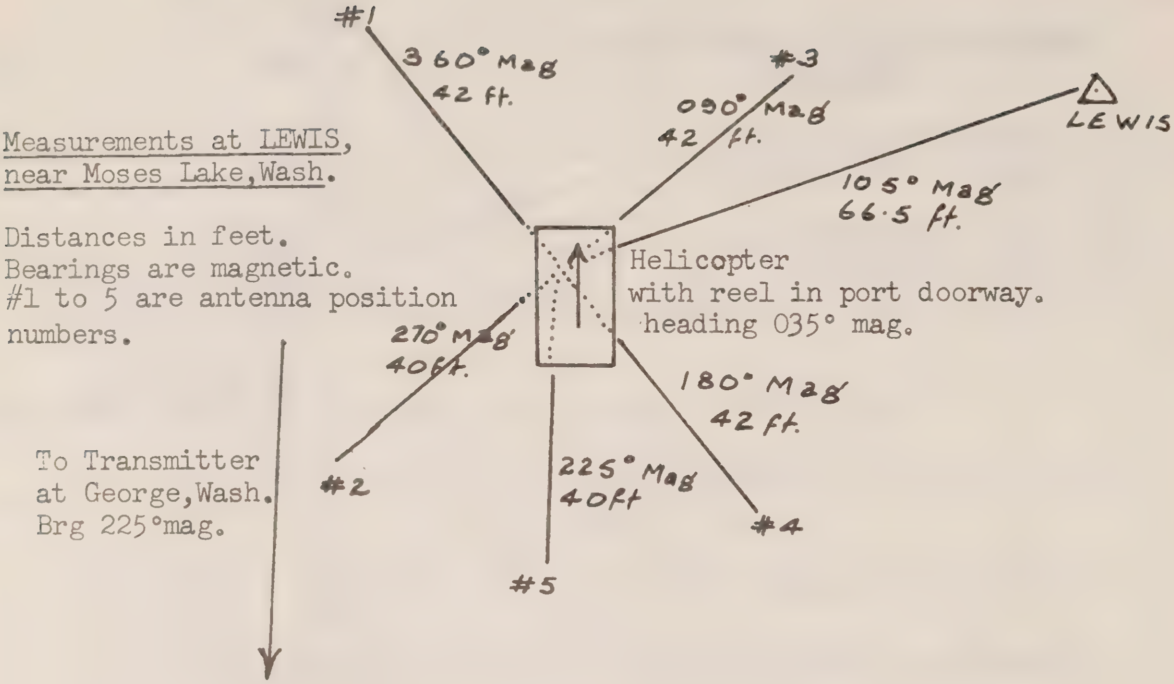
Observed on 11 March 1977, 0650-0830 P.S.T. (1450-1639 Z)

Table 1

TIME (Z)	POS'N	CYCLE NO.	GAIN	SAMPLE NO.	REMARKS
Before 1450	REF	2.92	45-52	25 633.54	Overnight location.
1507	1	3.5	40-43	38.34	1/2 cycle shift on laying out AC in direction of Tmtr.
1520	2	2.92	40	33.60	
1530	4	3.01	52	34.20	Lead-in forming a loop on the ground. * Readings unstable.
1607	3	(2.96) Unstable	49-51	33.73 Unstable	Many "gain error" messages

* When lead-in was flaked out in a series of small bights (loops), the reading became more stable.

FIGURE 3



Observed on 11 March 1977, 0930-1050 P.S.T. (1730-1850 Z)

Table 2

TIME (Z)	POSITION	CYCLE NO.	GAIN	SAMPLE NO.	REMARKS
1740	1	3.05	41	25 572.62	No ground. Stable
1745		3.05	41	72.68	Ground. Stable
1751	2	3.09	45	74.75	No ground. Unstable.
17553		3.09	44	74.14	Ground. Stable
1805	3	Fluctuating			No ground. Unstable.
1810		3.08	42	72.81	Ground. Stable.
		3.07	42	72.78	No ground.
	4	3.14-3.29	45	74.68-74.58	No ground. Unstable.
1824		3.09	44	74.19	Ground. Stable.
1830	5	3.16	44	74.80	Ground. Unstable.
1836		3.19	43	75.12	No ground.
1845		3.07	40	72.54	Ground.
1859		3.06	40	72.52	No ground.

Note - All readings taken in a hurry, due to need to return to base before dusk. (i.e. to Sidney, B.C.)

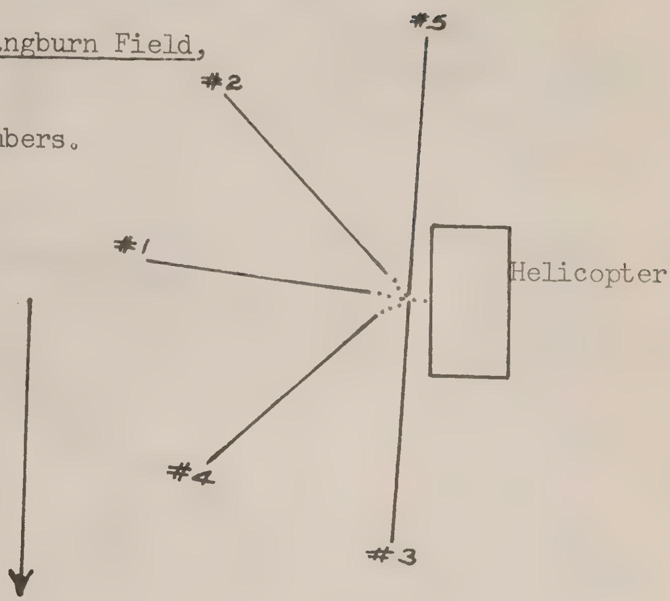
"Ground" was a short metal rod, approximately 50 cm, attached to the antenna coupler.

FIGURE 4

Second Set of Measurements at Pangburn Field,
Wenatchee, Wash.

#1 to 5 are antenna position numbers.
All antenna positions were
40 feet from the port door
of the helicopter.

Helicopter heading 290°mag.



Observed on 11 March 1977, 1124-1220 P.S.T.,

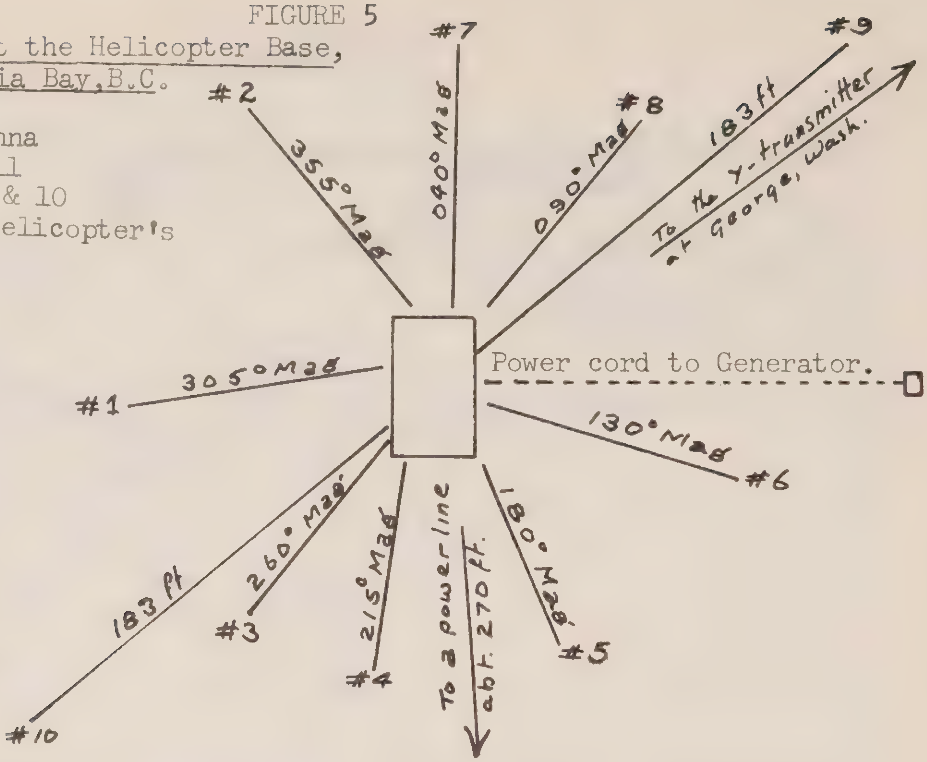
Table 3

TIME (Z)	POSITION	CYCLE NO.	GAIN	SAMPLE NO.	REMARKS
1930	1	3.00	54	25634.10	No Ground. Unstable
1935	1	2.91	55	33.8	Ground A. Unstable
	1	3.02	53	34.14	Ground B. Stable
1948	2	3.00	49	33.89	Ground.
1952	2	2.9±	49	34.±	No ground. Unstable
2003	3	3.53	53	37.30	No ground. Unstable
2010	4	3.4±	58	36.25	Insufficient time to settle.
2015	5	2.9	48	33.8	Insufficient time to settle.

"Ground" was a short metal rod attached by copper wire to the base coupler of the antenna.

FIGURE 5
Measurements at the Helicopter Base,
Patricia Bay,B.C.

#1 to 10 are antenna position numbers. All positions, except 9 & 10 are 40ft from the helicopter's port door.



Observed on 11 March 1977,1630-1730 P.S.T.,in light rain.

Table 4

TIME(Z)	POSITION	CYCLE NO.	GAIN	SAMPLE NO.	REMARKS
2355/11	1	3.19	77	26558.37	No ground.
0005/12	1	3.17	74	58.32	Ground. More stable with ground.
0015	2	3.18	77	58.36	No ground. } More stable with gnd.**
0020	2	3.17	75	58.33	Ground. } More stable with gnd.**
0030	3	3.17	76	58.31	No ground. } Stable
0040	3	3.17	75	58.32	Ground. } Stable
0050	4	3.20	78	58.22	On concrete. Unstable** close to 'copter tail.
0103	5	3.17	76	58.32	On concrete. Unstable**
0115	6	3.17	75	58.17	
0125	7	3.18	74	58.21	
0130	8	3.17	74	58.21	
0143	9	3.18	75-77	58.27*	183 ft. <u>towards</u> Tmtr.
0155	10	3.18	74	58.17*	183 ft. away from Tmtr.

Notes:

* Sample No. should have <u>increased</u> 0.3 μs going 100 m from pos'n 9 to pos'n 10. In fact it <u>decreased</u> 0.1 μs.

** Readings tended to be less stable at pos'ns 2, 4, 5, where lead-in is normal to direction of Tmtr. However pos'ns 4 & 5 were close to tail of 'copter.

"Ground" was a short metal rod attached by copper wire to Ac coupler.

immediately over the receiver. Thus the lead-in was near the "electrical centre" of the van; it was nearly vertical; it was reduced to the minimum length; and it was shielded by the metal body of the van. With this set up, we could detect no change in reading when we changed the orientation of the van with respect to the direction of the transmitter.

TRUCK OPERATIONS

The availability of a helicopter made it easy to reach mountain-top geodetic survey stations; which during the early spring in British Columbia are otherwise inaccessible. However, the antennae configuration used for monitoring from the helicopter gave intolerable uncertainties to our measurements, and it was necessary to bring the survey positions to the vehicle. The survey positions near Williams Lake, B.C. were defined by doppler satellite positioning, and the vehicle was a Ford 1-ton truck.

The Truck

The truck which was fitted with a custom built cab was designed to provide mobile electronics support for hydrographic survey parties. Electrical power was supplied from a four kilowatt (kw) gas-powered generator at 100 volts (v) A.C. or from mains power. The generator was mounted in a sound-proof compartment, set into the cab, and with access from outside the vehicle only. This generator ran equally well when the truck was moving as when it was stationary. The cab was sheathed with aluminum siding over a steel frame. The siding had riveted joints at the corners and between sheets which made good electrical contact. The cab was bolted to the chassis. The interior of the cab was sheathed with plywood and fitted with a work bench and equipment rack tiedowns. Ventilation was provided from two roof mounted vents. No other provisions were made for cooling or heating the cab.

This truck was close to being ideal as a mobile monitoring vehicle for Loran-C calibration. It provided a good electrical shield for the Loran-C receiver. The flat aluminum roof made a much larger ground plane for the antenna than was available in the helicopter operations. Only a very short antenna run was needed between the notch filter array and the antenna. The generator set provided adequate, good quality power. Good grounding was easily obtained by connecting ground stakes to the truck's main frame.

Loran-C Receiver Equipment

The following Loran-C monitor receiving system was installed in the truck: -

- 1 Austron 5000 monitor receiver;
- 1 PDP 8e computer;
- 1 U.S.C.G. Notch filter array;
- 1 Deltec uninterruptable power supply unit;
- 1 Line conditioner;
- 1 Cesium Frequency Standard HP 5062C;
- 1 Cesium Frequency Standard HP 5061A (belonging to the Canadian Coast Guard); and,
- 1 Antenna coupler, with 10 feet of 100 ohm balanced Twinnax cable.

The receiver and cesium frequency standards were mounted in racks with shock absorbers. Two antennae were used during these operations:

1 Fibreglass 9-foot whip antenna; and,
1 Stoddart Loop antenna, with matching transformer.

The Austron 5000 receiver was the U.S.C.G. instrument that served us well throughout the rest of the calibration. The notch filter array was made up by the U.S.C.G. to eliminate the interference conditions experienced at Comox, B.C. The uninterruptable power supply unit was essential to provide continuity in synchronization when power sources were changed from mains to truck generator. Two cesium standards were carried. The availability of the second cesium standard allowed checks to be made on the standard actually in use. Shielded Twinnax cable was provided by the U.S.C.G. and the shortest possible run was made between the notch filter array and the antenna coupler.

Both a whip and loop antenna were used during the truck operations. They were mounted on the roof of the truck. The whip antenna was used to sense the 'E' field of the Loran-C transmission and make T.O.A. measurements. The loop antenna was also used to make T.O.A. measurements sensing the 'H' field. These 'H' field T.O.A. measurements are, of course, 90° (or 2 1/2 μsec) advanced when compared to the 'E' field T.O.A.'s. The U.S.C.G. uses the Stoddart loop antenna, which has a gain of about 10 db less than the whip, to make field strength measurements. The loop, when its plane is perpendicular to the wave front, senses maximum signal strength. The signal strength decreases as the loop is turned through to 90°, where the plane of the antenna is parallel to the wave front. From this minimum the signal strength increases producing an absolute cosine form, maximizing again at 180°. There is approximately a 5 μsec (1/2 cycle) change (usually an increase) in T.O.A. as the plane of the loop is turned parallel to the wave front. The cycle number given by the U.S.C.G. monitoring system, which gives an indication of the point at which the T.O.A. is sampled within the Loran-C pulse, also changes as the loop is turned through the wave front.

The several measurements made using a loop antenna can give a qualitative appreciation of a monitoring site. If, as the loop is turned through 360°, the signal strength measurements are symmetric, and if, as the loop passes through 90° and 270° the half cycle change is clean; then the site can be assumed to be a good one. However, if the measurements are distorted it can be implied that locally, the phase and/or field strength of the signal are warped.[1]

Measurement Techniques

The causes of assymetry in the loop measurements can often be easily identified, e.g. power lines, tall trees, or even telephone lines.[2] When sites were selected to make phase measurements using a Decca frequency (127.5 Khz) the following distances from obstructions to the antenna were suggested in order to avoid phase distortion:

Tall trees	100 m
Power lines	200 m
Telephone lines	100 m.[3]

Even more stringent criteria were used for Loran-C time difference measurements by Pearch and Walker.[4] The general principle being to avoid electromagnetic scatterers.

Although a site may have no obstructions close by, topographic variations distort the phase and amplitude of the wave. Major features such as Death Valley, produce major discrepancies between observed and simply predicted T.O.A.'s.[5] Relatively minor isolated topographic features with a relief of less than 300 m can cause changes of 5 μsec from simply predicted T.D.'s over a distance of only a few kilometres.[6] These large differences were measured with a whip antenna; a loop antenna proved to be less sensitive to topography. Brunavs modelled a gaussian ridge with 1000 m elevation above a plane earth.[7] The model predicted a phase lag of more than 2 μsec on the lee side of the ridge.

The surficial geology of the monitoring area also influences measurements. Phase and field strength measurements change with ground conductivity. If the monitor site is close to a major geologic interface, a conductivity boundary will also exist. The coastline is, of course, the most dramatic example of such a boundary. If the propagation approaches a coastline site from landward there is, theoretically little effect on phase measurements.[7] Measurements made from a transmission approaching from seaward are more likely to cause problems. In general, areas of major conductivity change should be avoided by a distance of at least a wavelength.

Preliminary Tests

Some preliminary Loran-C T.O.A. measurements were made in the Victoria area to gain experience with truck operations. A site was selected on the Saanich Peninsula, near Saanichton, north of Victoria (see Figure 6). Monitor site selection in coastal B.C. is difficult. The topography is dramatic; and the flat areas that are accessible to a truck carrying delicate electronic equipment are generally close to civilization with its power and telephone lines. The site chosen was a tree farm, with young firs about 4 feet tall, well below the antenna ground plane. This plane was 3 miles from hills with about 1000 ft relief, but a little less than 2 miles from the coast. The nearest power lines (220 v domestic supply) were over 600 ft away.

After the experience with long wire antenna lead used in the helicopter, the first test to be conducted was to establish if the whip antenna, receiver and truck combination responded with relative accuracy to vehicle movement. The truck occupied four different positions with no relative coordinates. T.O.A.'s were measured at these four positions with truck pointing at the Y secondary for each measurement. The Y secondary has the strongest signal in the Victoria area.

The following table shows that movements measured with Loran-C in the truck, although by no means excellent, fall within usual Loran-C repeatability tolerances.

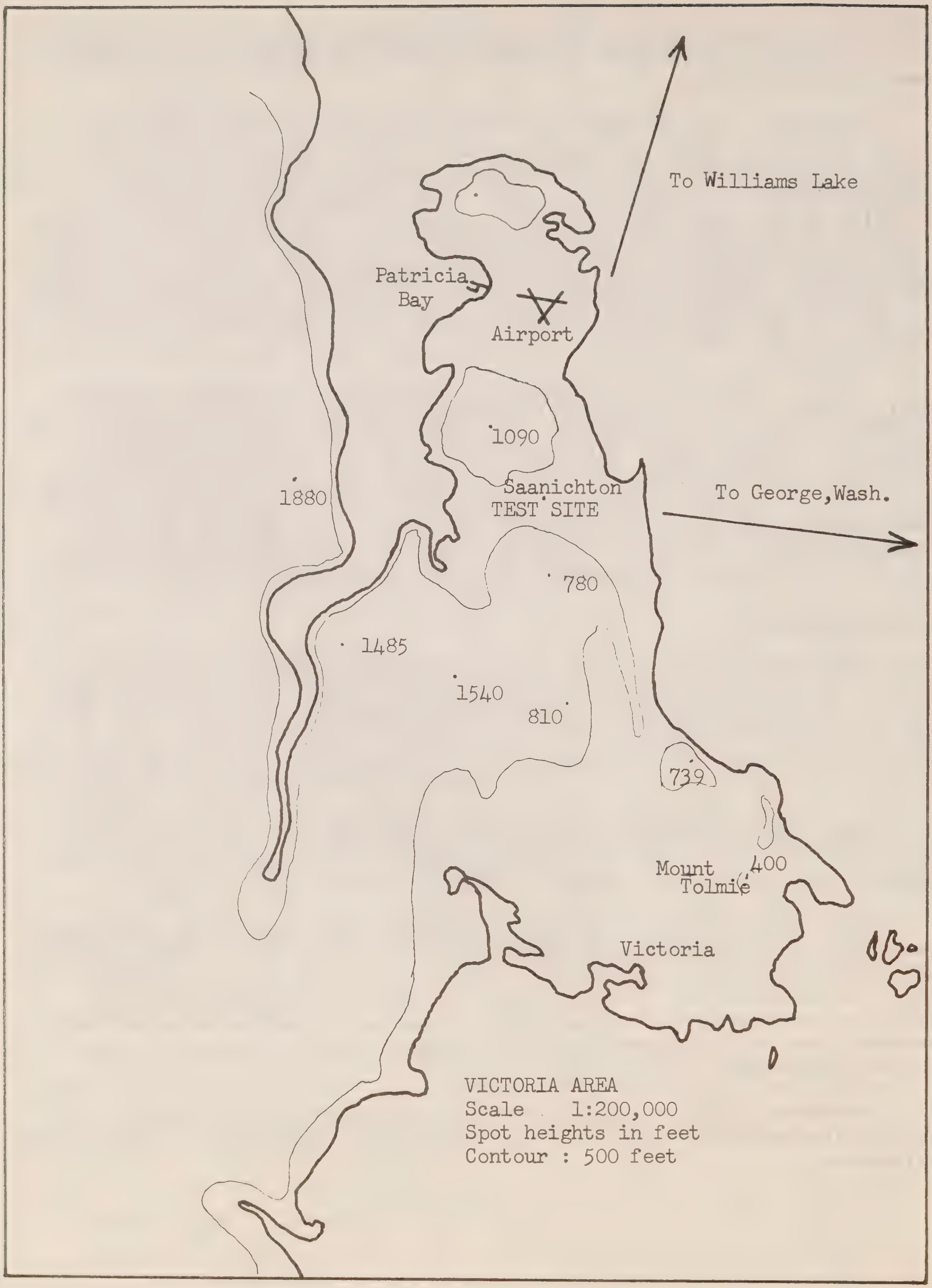

To Williams Lake
Patricia Bay
Airport
1090
1880
Saanichton
TEST SITE
To George,Wash.
780
1485
1540
810
739
Mount Tolmie
400
Victoria
VICTORIA AREA
Scale 1:200,000
Spot heights in feet
Contour : 500 feet

Figure 6.

Table 5. Response to Truck Movement.

	Tape and Compass azi.	Tape and Compass dist.	Loran-C azi.	Loran-C dist.
1.	0	0	0	0
2.	097°	40 m	106°	30 m
3.	277°	52 m	277°	76 m
4.	002°	127 m	006°	140 m
1.	0	0	204°	9 m

Next, the effect of the attitude of the truck, relative to the wave front, on T.O.A. measurements was considered. Sets of measurements were made with the truck pointing toward eight points around the compass. Table 6 shows the changes of T.O.A. relative to zero, where the truck was pointing at the Y secondary.

Table 6. Response (m/sec) to Truck Turning.

Angle	Master	Y	
000	0	0	pointing at Y
045	0.01	0.01	
090	0.01	0.02	
135	0.01	0.02	
180	0.02	0.03	
225	0.02	0.01	
270	0.03	0.03	pointing at Master
315	0.03	0.02	
000	0.03	0.03	

Again, the changes in T.O.A. on this test are within the tolerances usually accepted for Loran-C transmission. No cyclic effect is apparent But to ensure repeatability after this test all operational measurements were made with the truck pointing at the transmitter of interest. Similar sets of measurements were made at our monitor sites near the transmitters. Some variations of T.O.A. with the truck's attitude relative to the wave front became apparent when making measurements close to the transmitters.

Table 7. Response in (μsec) to Truck Turning close to Transmitters.

	Master 400 kw (nominal, abt 30 kms)	Y 1200 kw (nominal, about 32 kms)
000°	0.00	0.00
045°	-0.01	-0.03
090°	0.03	0.01
135°	0.03	0.04
180°	0.04	0.00
225°	0.04	
270°	0.03	
315°	-0.01	
000	0.00	

The effects of turning are slightly larger than at great distances from the receiver, but they are still not excessive. Grounding the truck appears to advance the T.O.A. by about 0.02 μsec. This change is derived from sets of T.O.A. measurements and is statistically significant. A similar response to grounding was obtained in both the damp marine clay at Saanichton and in the dry basic sand near Moses Lake. Throughout this test T.O.A. measurements were made without a ground on the truck.

In summary, the conditions, under which the principal T.O.A. measurements were made are:

1. Whip antenna;
2. Truck pointing at transmitter of interest; and,
3. No ground.

Field Work

The main calibration was a sea-going operation and the travel time measurements from the transmitters to the coast had to be tied into the T.O.A. measurements made in the ships. Therefore, the first operational monitor site to be occupied was Station BOLE at Patricia Bay, the departure point for the ships (see Figures 7 and 8). Unfortunately this site is far from ideal for making T.O.A. (or field strength) measurements, but it served adequately to transfer synchronization from the land to the sea part of the calibration. The site at Patricia Bay was used several times with the truck. The conditions of measurement varied with each occupation as ships came and went, or as power supplies to the wharf were switched on or off.

The other site used for monitoring the Loran-C in the Victoria area was Mount Tolmie, a geodetic survey station, at the top of a dioritic knob with an elevation of 150 m.

On the 27th of May 1977 the calibration party left Victoria for Wenatchee,

AT STATION ▲ BOLE
LOOP ANTENNA
TIME OF ARRIVAL OBS. (———)
CYCLE NUMBER OBS. (.........)

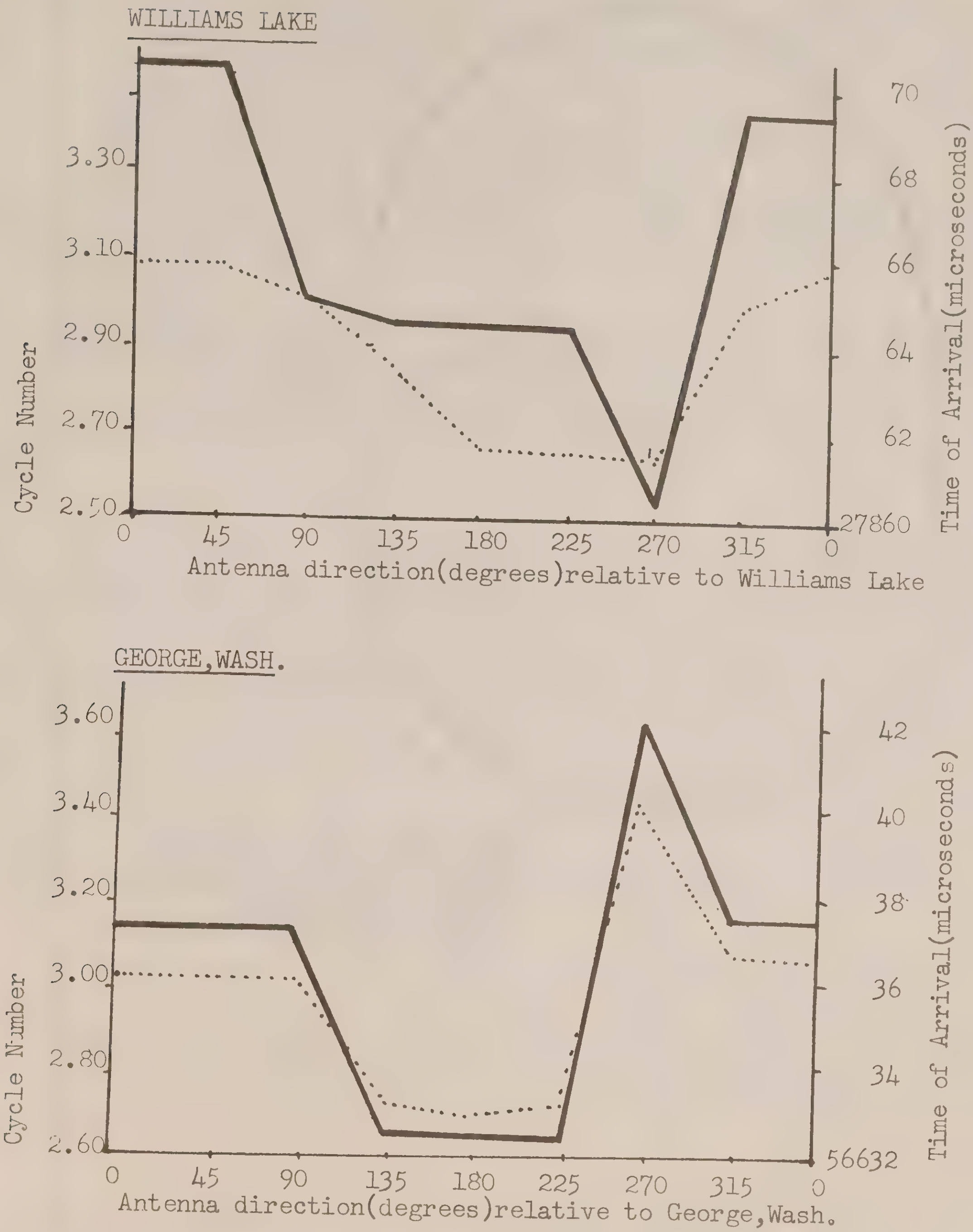


Figure 7.

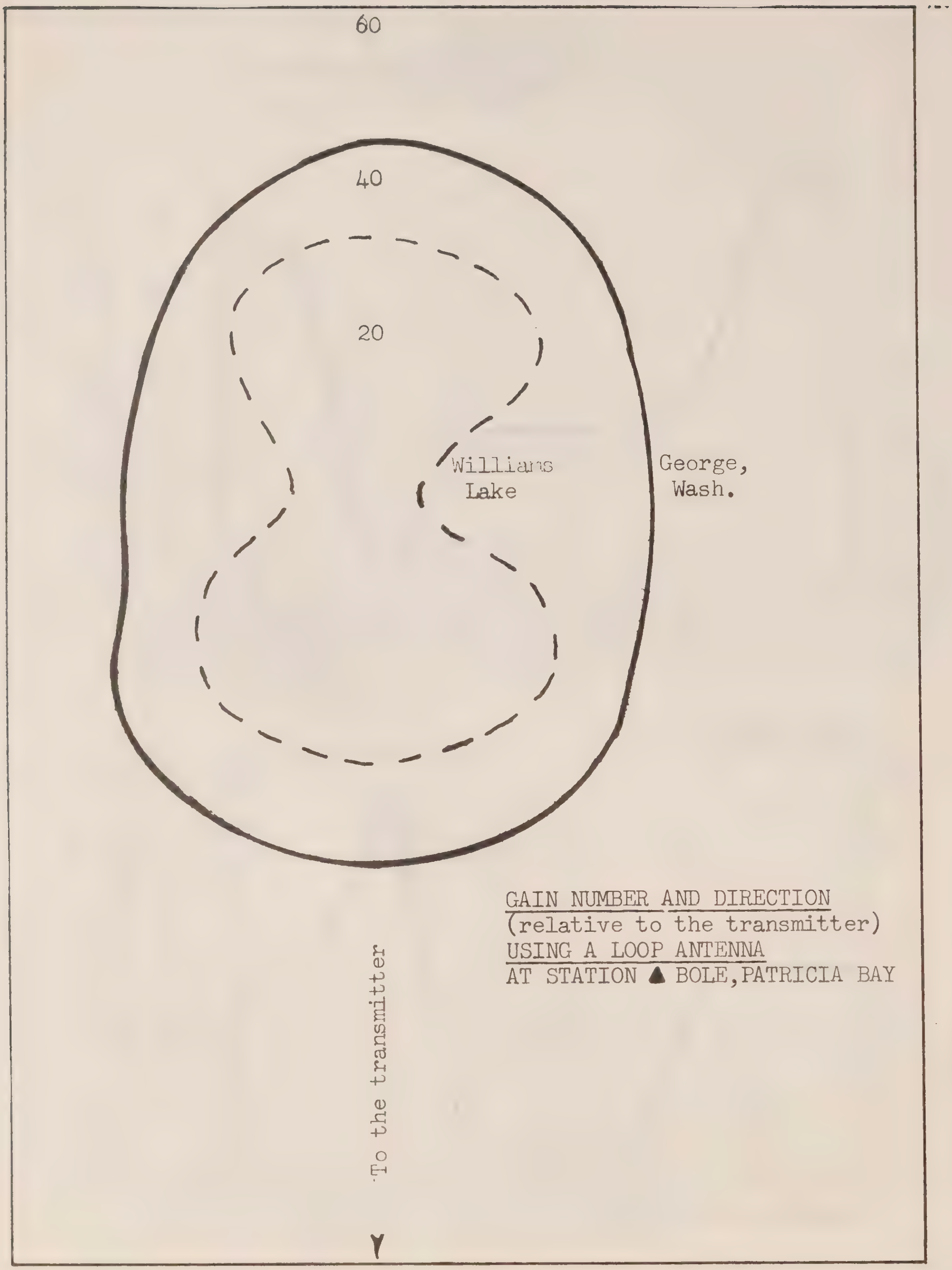

60
40
20
Williams
Lake
George,
Wash.
GAIN NUMBER AND DIRECTION
(relative to the transmitter)
USING A LOOP ANTENNA
AT STATION ▲ BOLE, PATRICIA BAY
To the transmitter

Figure 8.

Washington to make measurements near the Y secondary transmitter at George, Washington. To put the Loran-C receiver into travel status was simple. The procedure follows:

1. If using mains power, start the truck's electric generator.
2. Using the uninterruptable power supply to maintain continuity of power and synchronization, throw the breaker from mains to truck supply. After the generator has settled down under its new load, remove the mains supply cord.
3. Make sure the receiver nominal gain and ambient gain are the same. Clamp the receiver gain within, say, 6 db.
4. Remove the antenna. When travelling near the transmitter a short length of copper wire (1 ft) will serve as an adequate travelling antenna. Using this substitution allows the signal to be tracked whilst on the road.

On arrival at a monitor site the procedure was reversed. Travel from Victoria is complicated by the need to use a ferry. Gas engines cannot be run inside car ferries but there are several 110 v, 60 htz. power outlets available on B.C. ferries. Both United States and Canadian Customs and Immigration officials were most helpful on every occasion we crossed the border.

With the aid of Lt. R. Armstrong, U.S.C.G., T.O.A.'s were measured at five sites in Washington State. See Figure 9. A U.S. Geological Survey Station near Moses Lake, 32 km from the transmitter, was selected as the primary site. Measurements were made over an eight hour period for T.O.A. At this station the truck was turned through 360° with measurements being made every 45°. Using the whip antenna, similarly, with the truck pointing at the station, sets of T.O.A.'s were measured every 45° as the loop antenna was rotated. The data in Table 7 show that the effect of turning on T.O.A.'s was found to be greater near the transmitters. As was experienced in the helicopter excursion, the near field effect, due to great signal strength, exaggerates phenomena which cause only small errors when at a long distance from the transmitter. A thunder shower occurred at the transmitter in mid-afternoon. This shower caused a 0.15 μsec jump in our T.O.A. readings. The T.O.A. reading returned to its previous state after the shower had passed.

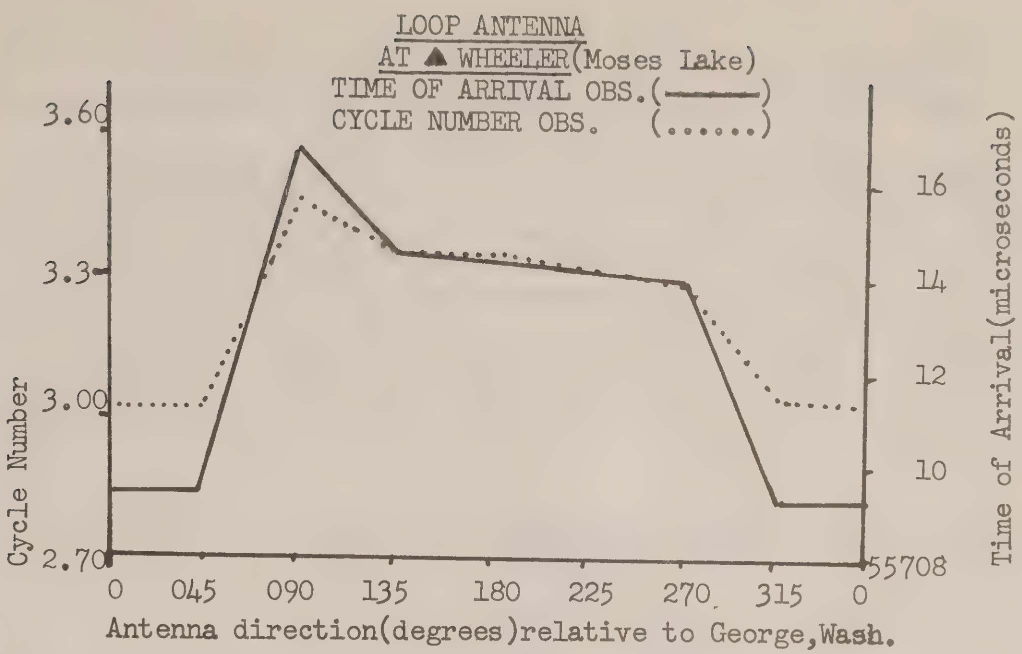
A second monitor site was occupied east of Moses Lake, about 52 km from the transmitter. This site, Station Wheeler, was considered to be outside the near field because; 1) there was no response in the T.O.A. when turning the truck, and 2) loop antenna measurements were symmetric (see Figure 10). The second site was marked by a U.S. Geological Survey marker. Although not an ideal monitoring place the observations obtained here were extremely stable.

Two other sites, one east and one west of the Cascade Mountains were used to try to define A.S.F. Near Wenatchee, at Fancher Field, a full set of T.O.A. measurements was made. On the other side of the mountains, near Arlington, another set of T.O.A. readings was obtained. The fifth site where measurements were made in Washington was at Pangburn Field, Wenatchee. This site had been used during the helicopter excursion, and measurements were made to provide an additional tie between that operation and the truck trip.

TRUCK ROUTES

LORAN-C CALIBRATION PROGRAM

Figure 9.


LOOP ANTENNA
AT ▲ WHEELER(Moses Lake)
TIME OF ARRIVAL OBS.(————)
CYCLE NUMBER OBS. (......)
3.60
3.3
3.00
2.70
Cycle Number
16
14
12
10
55708
Time of Arrival(microseconds)
0
045
090
135
180
225
270
315
0
Antenna direction(degrees)relative to George,Wash.

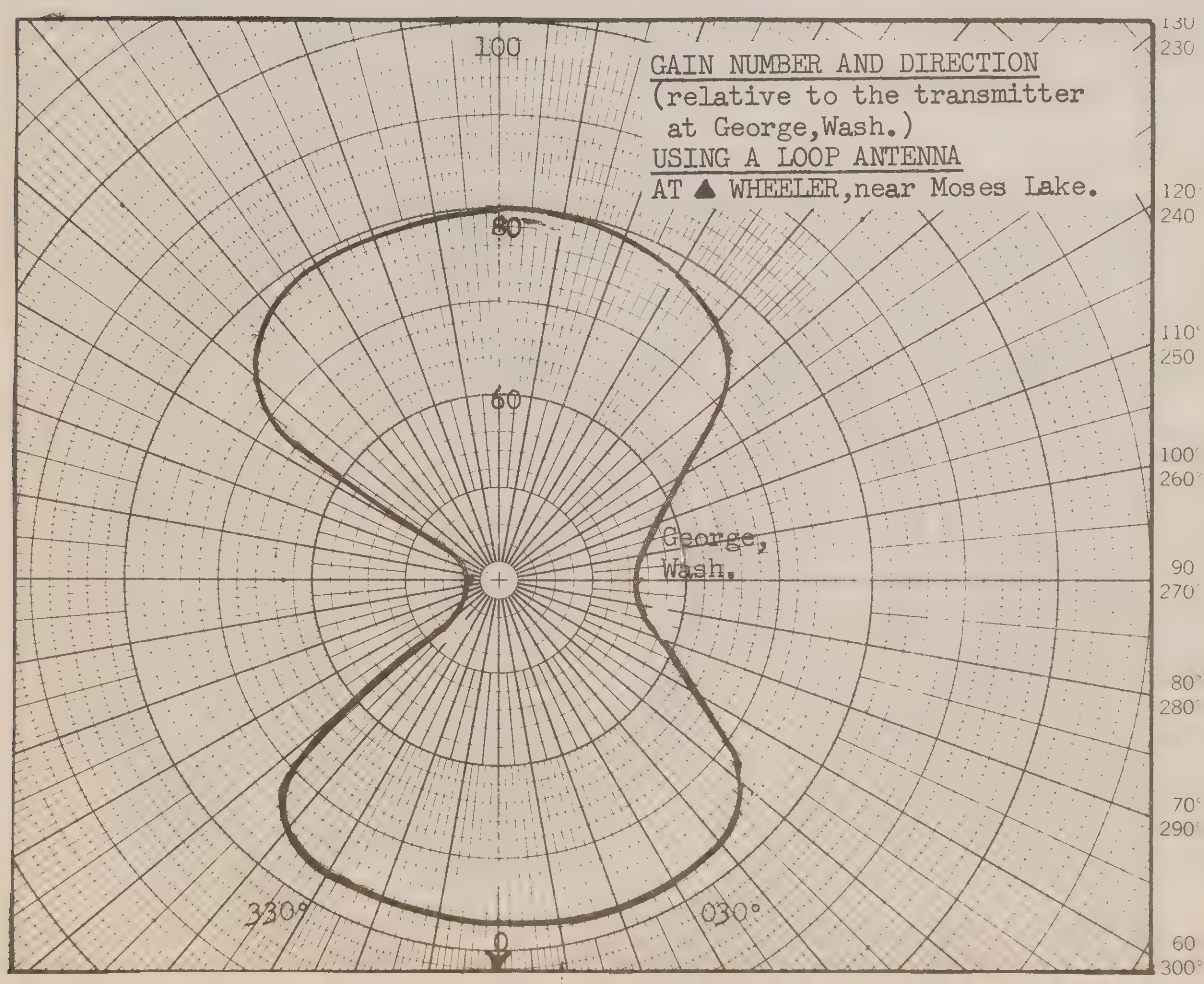

GAIN NUMBER AND DIRECTION
(relative to the transmitter
at George,Wash.)
USING A LOOP ANTENNA
AT ▲ WHEELER,near Moses Lake.
100
80
60
George,
Wash.
330°
030°
0
130
230
120
240
110
250
100
260
90
270
80
280
70
290
60
300°

Figure 10.

On the return to Patricia Bay, the first operational monitor site was occupied four times in two days. The Mount Tolmie site was also re-occupied. Thus, as synchronization had been maintained throughout the trip, two independent loops had been measured. Also a clock rate had been established.

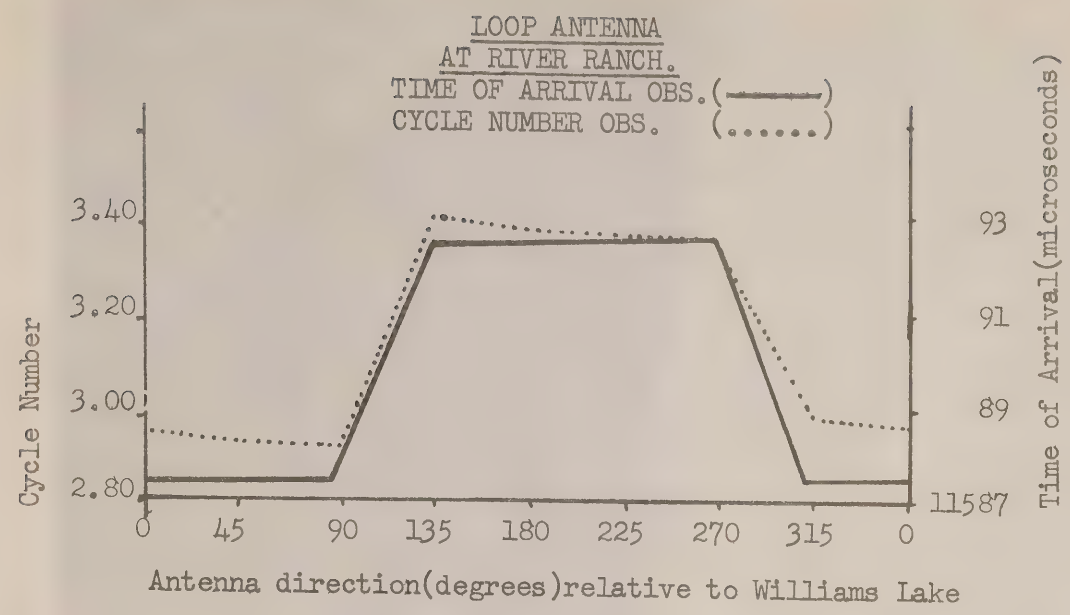
A second trip was started on 2 June 1977 to make measurements at Williams Lake, near the master transmitter. This time a J.M.R. doppler satellite receiver was rented from Shell Resources, Calgary, to establish geographic coordinates for the monitor sites. The first monitor site in the Williams Lake area to be occupied was at River Ranch, 30 km west of the transmitter (see Figures 11 and 12). As we had to be at River Ranch for three days in order to acquire sufficient satellite passes, we had ample time to make our usual turning tests. It was also possible to investigate the effect of clamping the gain on the U.S.C.G. Austron receiver at levels other than the ambient gain level.

Being only 30 km from the transmitter, measurements at the River Ranch site suffered from some near field effects. Therefore, another site was selected at Alexis Creek, 64 km west of the transmitter. Our attempts to make the usual measurements here were thwarted by problems with the truck's generator. Also, as the truck was not air-conditioned, the cesium standard controlling the receiver timing generated unstable output during some unseasonably hot weather. Synchronization was lost and the calibration party returned to Victoria, where further monitor measurements were made to establish a good clock rate.

Clock Rate

Our measurements of travel time from the transmitters to the coast are entirely dependent on knowledge of the frequency offset (clock rate) of the cesium standard controlling the master's Loran-C transmission and of the mobile cesium standard. Therefore, the mobile cesium standard was treated with loving care and due attention, as it was hoped to keep variations from the known frequency offset (clock rate) to a minimum. The cesium standard at the master transmitter was kept in a stable environment, but the mobile one suffered from vibration, shock, temperature changes and changes in magnetic field. To avoid vibration and shock the cesium standard was installed in a shock mounted equipment rack. A short series of phase comparisons between an H.P. 5061A and 5062C cesium standard were made during the truck journey along the gravel road from Alexis Creek to Williams Lake. This comparison was made using an H.P. 454 oscilloscope. The comparison showed no abnormal deviations in clock rate that could be attributed to shock or vibration. Further phase comparisons between the two cesium standards were made in the Victoria area. For these tests the truck with one cesium standard on board, was driven around the Victoria area, over a variety of road conditions, for a period of 3 hours. After the three hours of exposure to vibration, the mobile cesium standard was then compared for three hours to one that had been kept under stable conditions. Again no variation in clock rate that could be attributed to moving was discernible (see Figure 13).

Excessively high temperatures inside the equipment units caused instability in the frequencies generated by the cesium standards. During field


LOOP ANTENNA
AT RIVER RANCH.
TIME OF ARRIVAL OBS.(———)
CYCLE NUMBER OBS. (......)
Cycle Number
3.40
3.20
3.00
2.80
Time of Arrival(microseconds)
93
91
89
11587
0
45
90
135
180
225
270
315
0
Antenna direction(degrees)relative to Williams Lake

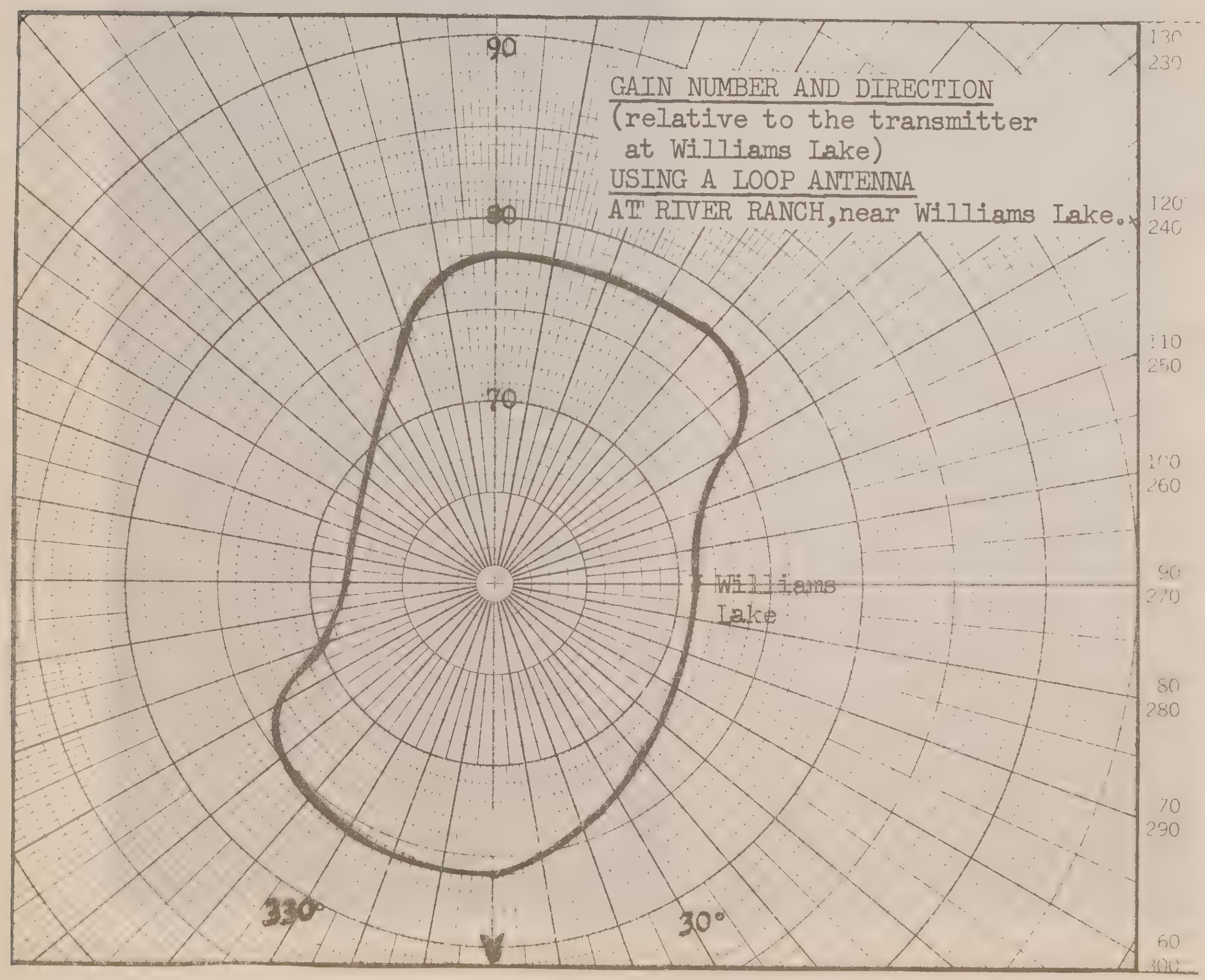

GAIN NUMBER AND DIRECTION
(relative to the transmitter
at Williams Lake)
USING A LOOP ANTENNA
AT RIVER RANCH,near Williams Lake.
90
80
70
Williams
Lake
330°
30°

Figure 11.

RIVER RANCH MONITOR SITE

Figure 12.

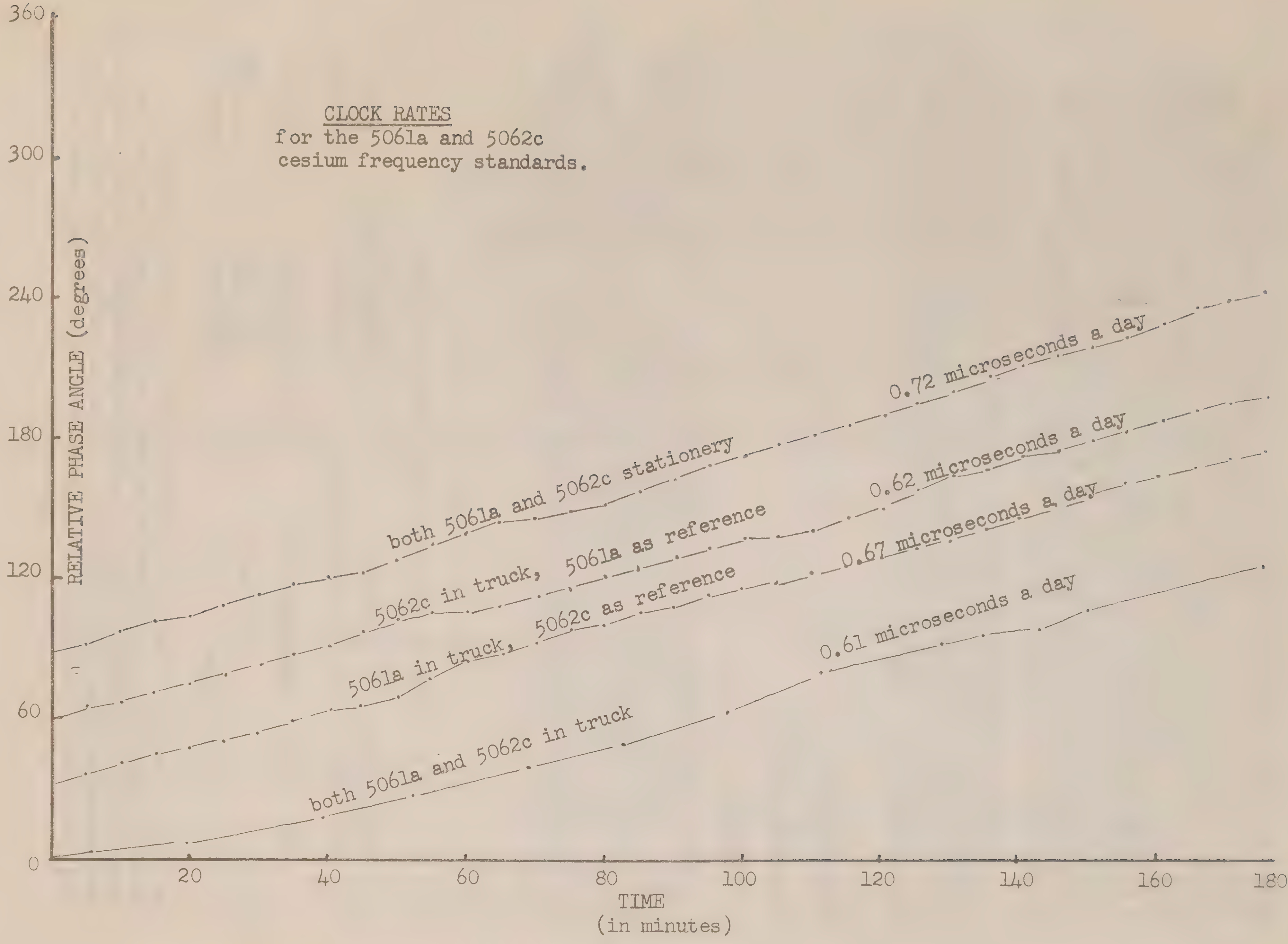

CLOCK RATES
for the 5061a and 5062c
cesium frequency standards.
RELATIVE PHASE ANGLE (degrees)
360
300
240
180
120
60
0
20
40
60
80
100
120
140
160
180
TIME
(in minutes)
both 5061a and 5062c stationery
0.72 microseconds a day
5062c in truck, 5061a as reference
0.62 microseconds a day
5061a in truck, 5062c as reference
0.67 microseconds a day
both 5061a and 5062c in truck
0.61 microseconds a day

Figure 13.

operations the outside temperature was only 24° Celsius. But the temperature inside the truck was higher, and the temperature adjacent to the cesium beam was assumed to have exceeded specifications. Subsequent clock rating tests in Victoria, comparing the mobile 5061A with the master 5061A were made in a poorly ventilated room with a southern exposure. The room temperatures reached 32° C. The cesium standard did not itself indicate a frequency change until after a change in T.O.A. of 0.3 microseconds had occurred. Thus the T.O.A.'s measured from Williams Lake and from George, Washington showed a strong diurnal change and recovery. It is assumed that these changes in clock rate are associated with temperature changes that approach the cesium standard's specifications (see Figure 14).

Earlier low temperature tests at the Bedford Institute showed good ventilation for the cesium standard is essential if the instrument is to maintain a stable frequency when temperatures approach specification limits. At no time did the clock rates established during the calibration exceed the manufacturer's specifications with indicator lights functioning.

DATA ANALYSIS

Helicopter Data

1) Master

The T.O.A. loop using the helicopter was, in fact, only a single direction. The receiver acquired the signals at Patricia Bay (station BOLE) but when the helicopter arrived at Williams Lake Airport the signals could not be acquired without loss of synchronization with the readings at BOLE. After that, the start-up procedures were modified to solve this problem. A loop from Williams Lake Airport to two nearby Geodetic points was attempted and satisfactorily closed back at Williams Lake Airport. The next day the T.O.A. was carried from Williams Lake Airport to BOLE at Patricia Bay.

Table 8.

T.O.A.'s - WILLIAMS LAKE (HELICOPTER DATA)

Day	Time	Place	Master T.O.A.	Y-Slave
067	1926	Williams Lake Airport	39951.670	10849.860
068	0140	Bole Eccentric	41102.795	9970.761
		Ecc. Corr.	.026	.290
		Bole	41102.821	9970.471

The T.O.A. Loop with the truck, started at BOLE to geodetic TOLMIE in Victoria, then with a new synchronization from BOLE across the ferry to Tsawwassen to two doppler satellite points RIVER RANCH AND ALEXIS CREEK near the transmitter. At ALEXIS CREEK the system got too hot and the receiver lost the signal. The system re-acquired the signals and was moved to

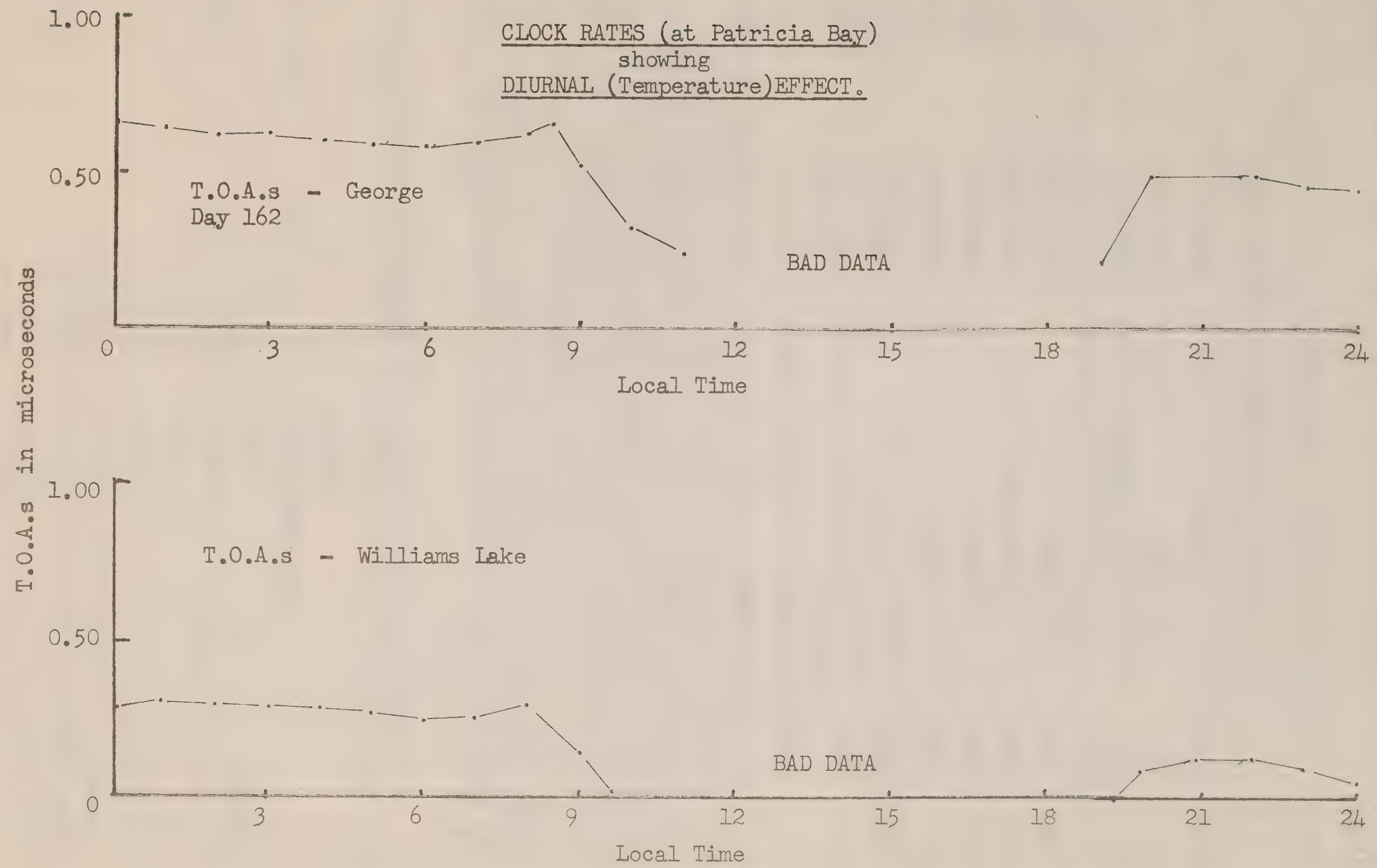

CLOCK RATES (at Patricia Bay)
showing
DIURNAL (Temperature)EFFECT.
T.O.A.s - George
Day 162
BAD DATA
T.O.A.s in microseconds
1.00
0.50
0
3
6
9
12
15
18
21
24
Local Time
T.O.A.s - Williams Lake
BAD DATA
Local Time

Figure 14.

Williams Lake Airport where it lost the signals again shortly after arriving there.

Table 9.

T.O.A.'s - WILLIAMS LAKE (TRUCK DATA)

Day	Time	Place	Master	Y-Slave
152	1622	BOLE	27874.200	56642.090
152	1822	TOLMIE (ECC.)	27940.734	56578.778
154	1502	BOLE	12746.717	41514.597
154	1800	TSAWWASSEN	12596.158	41525.099
157	0030	RIVER	11590.058	42357.354
158	1030	ALEXIS	11701.821	42476.902
159	1000	ALEXIS	50354.409	21229.478
159	2200	WILLIAMS LAKE AIRPORT	50246.099	21152.029*

* Based on very few, erratic values.

The clock used for the helicopter and truck loop to George was the 5062C cesium, and for the truck loop to Williams Lake the 5061A cesium. The clock rate used for the 5062C was +0.24 microseconds/day based on the clock rates used on the ship-board calibration cruises. The clock rate used for the cesium 5061A was -0.35 microseconds/day based on clock rates at Alexis Creek and on intercomparison between the two cesiums during that period using an oscilloscope to note the phase difference of the signals. Other clock rates were, -0.213 microseconds/day at the motel during day 155, -0.155 on Master and -0.139 microseconds/day on Y-Slave at RIVER RANCH, -0.348 on Master and -0.401 microseconds/day on Y-Salve at ALEXIS CREEK before getting too hot, and -0.350 on Master and -0.545 microseconds/day on Y-Slave at ALEXIS CREEK on day 159.

All the T.O.A.'s were reduced to a value to correspond to the ship at Patricia Bay wharf having a set value.

Table 10.

REDUCED T.O.A.'s - WILLIAMS LAKE

Location	Master	Y-Slave
Ship at Patricia Bay	13569.558	42337.478
BOLE	13569.30	42337.35
TOLMIE (ECC.)	13635.64	42273.87
TSAWWASSEN	13418.78	42347.89
ALEXIS CREEK	12525.74	43300.98
RIVER RANCH	12413.48	43180.94
Williams Lake Airport (by truck)	12417.61	43223.70*
Williams Lake Airport (by helicopter)	12148.21**	43216.80

* based on very poor observations. ** used as a check only.

2) Y-Slave

The helicopter T.O.A. Loop to George went from BOLE at Patricia Bay to Bellingham to Wenatchee (Pangburn) Airport to LEWIS and returned with the same intermediate stops after losing synchronization part way though the readings at LEWIS. There was also an opportunity to clock rate overnight at Seattle (Boeing) Airfield. The clock rate was -0.1731 microseconds/day.

Table 11.

T.O.A.'s - GEORGE, WASHINGTON (HELICOPTER DATA)

Day	Time	Place	Y-Slave
68	2141	BOLE ECC.	13775.829
68	2238	Bellingham	13624.251
69	1935	Pangburn	12845.604
69	2158	LEWIS	12784.641
69	2230	LEWIS	25572.633
70	0218	Pangburn	25633.708
70	2216	Bellingham	26412.381
70	2326	BOLE ECC.	26563.640

It was during this synchronization loop that it was found that moving the antenna had an adverse effect on the readings. In fact, it was suspected at the time that the readings were next to useless. It was for this reason that repeating the synchronization loops with the helicopter was suspended in favour of transporting the equipment by truck.

The derived T.O.A.'s were adjusted by a clock rate of 0.07 microseconds/day (based on loop closures within this larger loop) and to a set value for the ship at Patricia Bay.

Table 12.

REDUCED T.O.A.'s - GEORGE, WASHINGTON (HELICOPTER DATA)

Location	Y-Slave	
Ship at Pat Bay	42337.478	
BOLE	42337.35	
Bellingham	42186.06	
Pangburn	41407.35	
LEWIS	41346.38	
Pangburn	41407.45	closure value
Bellingham	42186.06	closure value
BOLE	42337.03	closure value

The truck started from BOLE to TOLMIE (Ecc.) in Victoria to BOLE to Tsawwassen Ferry Dock to the Thunderbird Motel in Wenatchee to LEWIS to Wheeler to Pangburn Airfield (Ecc.) back to Thunderbird Motel. Then the truck went to Fancher Airfield near Wenatchee to ARLINGTON to Tsawwassen to BOLE.

Table 13.

T.O.A.'s - GEORGE, WASHINGTON (TRUCK DATA)

Day	Time	Place	Master	Y-Slave
147	1552	BOLE	27872.139	56640.043
147	1829	TOLMIE Ecc.	27938.580	56576.669
147	2225	BOLE	27872.402	56640.305
148	1500	BOLE	27872.684	56640.573
148	1813	Tsawwassen	27722.161	56651.154
149	0940	Thunderbird		55742.136
149	2250	LEWIS	28532.127	55650.287
150	1838	WHEELER	28591.660	55712.100
151	0014	Pangburn (Ecc.)		55710.403
151	1556	Thunderbird		55744.190
151	1805	Fancher		55739.382
151	2314	ARLINGTON	28021.561	56278.784
152	0303	Tsawwassen	27723.23	56651.77
152	0624	BOLE	27973.980	56641.843

Observed clock rates during this synchronization loop are shown in Table 14.

Table 14.

SHORT TERM CLOCK RATES - GEORGE, WASHINGTON (TRUCK DATA)

Day	Place	Hours	Y-Slave
148	Victoria	9	0.3729 microsec/day
149	Thunderbird Motel		0.1997
150	Moses Lake Hallmark Motel	12	0.2377
151	Thunderbird Motel	12	0.2200

Clock rates derived from closure on previously occupied points are listed in Table 15.

Table 15.

LONG TERM CLOCK RATES - GEORGE, WASHINGTON (TRUCK DATA)

	Master	Y-Slave
BOLE-BOLE	0.3559	0.3487 microsec/day
Tsawwassen-Tsawwassen	0.2550	0.1829
Thunderbird-Thunderbird		0.9084

There is obviously some discrepancy in the clock rates. Both times occupying the point at Tsawwassen and the second time at Thunderbird Motel were very short and perhaps the signals had not completely settled down on the proper tracking point within the pulse. The overnight clock rating at Thunderbird Motel on day 151 was at a different parking spot than for day 149 and in the morning the truck was moved into the previous parking spot for a few minutes.

Thus the most reliable and consistent clock rates were the closures at BOLE and the clock rate at Victoria. Therefore, 0.35 microseconds/day was used. The reduced T.O.A.'s are given in Table 16.

Table 16.

REDUCED T.O.A.'s - GEORGE, WASHINGTON (TRUCK DATA)

Place	Master	Y-Slave
Ship at Pat Bay	13569.558	42337.478
BOLE	13569.30	42337.35
TOLMIE Ecc	13635.70	42337.94
BOLE	13569.47	42337.52
BOLE	13569.30	42337.35
Tsawwassen	13418.73	42347.88
Thunderbird Motel		41438.64
LEWIS	14228.28	41346.60
WHEELER	14287.52	41408.12
Pangburn(Ecc.)		41406.35
(Pangburn)		(41406.69)
Thunderbird Motel		41439.90
Fancher		41435.06
ARLINGTON	13716.86	41975.10
Tsawwassen	13419.41	42347.32
BOLE	13569.32	42337.35

Closure within the synchronization Loop with the truck should be noted.

Table 17.

LOOP CLOSURE - TRUCK DATA - GEORGE, WASHINGTON

Place	Master	Y-Slave
Thunderbird Motel		1.26
Tsawwassen	-0.32	-0.56
BOLE	0.02	0.00

Comparison with synchronization Loop by helicopter should also be noted.

Table 18.

LOOP CLOSURE - HELICOPTER DATA - GEORGE, WASHINGTON

Place	Y-Slave
LEWIS	0.06
Pangburn	-0.87

Some explanation of the poor results is obviously required. We had expected closures to 0.1 microseconds and these closures are up to 12 times that value. As previously mentioned, some of the readings at the Thunderbird Motel and at Tsawwassen were for very short sampling periods where the receiver might not have settled down on the proper tracking point. At Pangburn Airfield the location of the truck and helicopter were different by 499 ft (152.1 m) and the close proximity of forest fire chemical tanks and a concrete block service building might have local effects. Also all readings taken with the helicopter have to be taken with "a grain of salt".

Clock Synchronization

1) Shoal Cove. Synchronization with the Shoal Cove secondary was effected by clock rating at Masset with the receiver in C.S.S. Parizeau (see reference #1). The mean T.O.A. of the Shoal Cove transmission was reduced by the theoretical transmission time to produce the necessary clock synchronization value. The theoretical transmission time is a function of the land conductivity since there is a small amount of land between Shoal Cove and Masset. The observed T.O.A. at Masset was 26220.72 microseconds at 18:20 GMT on day 88. This was reduced by a clock rate of 0.2733 microseconds/day back to day 82.00, the theoretical baseline travel time and coding delay, travel time over an all seawater path, and the theoretical A.S.F. The theoretical A.S.F. varies with land conductivity as given in this table:

Table 19.

SHOAL COVE SYNCHRONIZATION - CONDUCTIVITY AND A.S.F.

Land Conductivity	Theoretical ASF for Masset on X-Slave
0.0002 mho/m	1.92 microseconds
0.0004	1.60
0.0006	1.37
0.0008	1.22
0.0010	1.10
0.0012	1.01
0.0014	0.94
0.0016	0.88
0.0020	0.79
0.0025	0.71

There is the possibility that the land conductivity could be some other value than the one selected. Since the conductivity is almost certainly within the range 0.0006 to 0.0020, the theoretical A.S.F. varies by 0.6 microseconds or 0.3 microseconds from a more central value. I have chosen 0.0010 mho/m as the most likely value of the conductivity. The uncertainty in A.S.F. is directly connected to the uncertainty in the clock synchronization.

Table 20

SHOAL COVE SYNCHRONIZATION

T.O.A.	26220.72
Sea water travel time	565.25
Clock rate correction	1.85
Baseline travel time plus coding delay	13343.58
A.S.F.	1.10
Clock Synchronization	12308.94

The position of the ship at Massett was 54°-00'-33.383" N, 132°-08'-58.063"W and at Patricia Bay it was 48°-39'-13.409" N, 123°-27'-04.758" W.

2) Williams Lake & George. The positions of the antenna at the calibration points in the loops to Williams Lake and George are given in Table 21.

Table 21

OBSERVATION STATION POSITIONS

LEWIS	47°-11'-43.342"	119°-21'-25.970"
WHEELER	47°-07'-45.530"	119°-04'-30.801"
FANCHER	47°-26'-59.819"	120°-16'-50.989"
ARLINGTON	48°-11'-17.528"	122°-09'-04.502"
BOLE	48°-39'-15.336"	123°-27'-00.855"
TOLMIE	48°-27'-25.186"	123°-19'-28.401"
ALEXIS CREEK	52°-07'-04.285"	123°-16'-09.057"
RIVER RANCH	51°-53'-45.859"	122°-47'-51.093"

The method was to reduce the T.O.A.'s at each calibration point by the sea water travel time plus the A.S.F., which is dependent on land conductivity to obtain the associated clock synchronization. The land conductivity that produces the same clock synchronization at all the calibration points is deemed to be the one that is most suitable for the actual clock synchronization. In Figure 15, a graph of the clock synchronization versus land conductivity for the calibration points, the most likely value of the clock synchronization is 12309.90 which occurs at 0.0013 mho/m land conductivity.

For George, the T.O.A.'s were further reduced by the theoretical baseline travel time and coding delay of 28927.37 microseconds and Figure 16 shows the resulting graph of clock synchronization versus conductivity. ARLINGTON is immediately to the west of the mountains and so the A.S.F. function, which assumes smooth terrain, does not account for A.S.F. due to the rough terrain. The A.S.F. due to rough terrain theoretically diminishes farther away from the roughness. Therefore, the A.S.F. for BOLE using smooth terrain is probably valid. The intricate Johler formula was experiencing difficulty computing secondary phase lag on long lines and low land conductivities and in fact would not compute reasonable numbers for land conductivities below 0.004 or for 0.0007.

Therefore all the secondary phase lag tables for conductivities of 0.0012 mho/m and lower were recomputed using the accurate secondary phase lag program written by Paul Brunavs for his March 1977 report on approximate formulae for secondary phase lag prediction. There were differences of only 0.01 microseconds for conductivities between 0.0010 and 0.0006 and much larger differences at lower conductivites.

The upswing at low conductivities for the longer lines in both Figures 15 and 16 is worth noting. A study of the maximum secondary phase lag at constant distance and constant permittivity occurs at a non-zero value of conductivity. For shorter distances it occurs at slightly lower conductivities. Therefore, it is the longest line that starts to swing up first as the conductivity is lowered followed by the next longest line and so on

It appears that the best land conductivity between LEWIS and BOLE is 0.0006 and between LEWIS and ALEXIS/RIVER is 0.0008 mho/m. Because of the

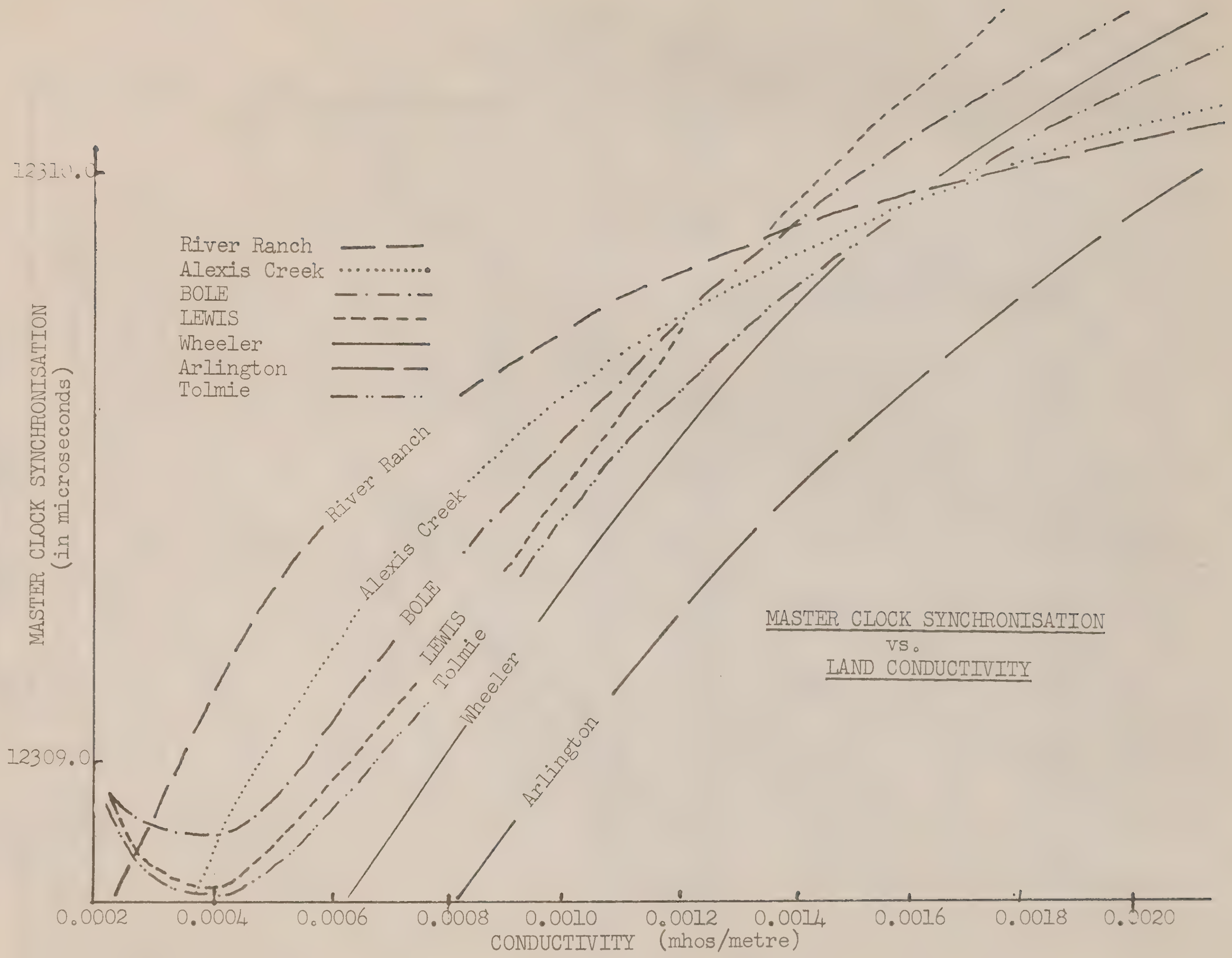

MASTER CLOCK SYNCHRONISATION
vs.
LAND CONDUCTIVITY
River Ranch
Alexis Creek
BOLE
LEWIS
Wheeler
Arlington
Tolmie
MASTER CLOCK SYNCHRONISATION
(in microseconds)
12309.0
0.0002
0.0004
0.0006
0.0008
0.0010
0.0012
0.0014
0.0016
0.0018
CONDUCTIVITY (mhos/metre)

Figure 15.

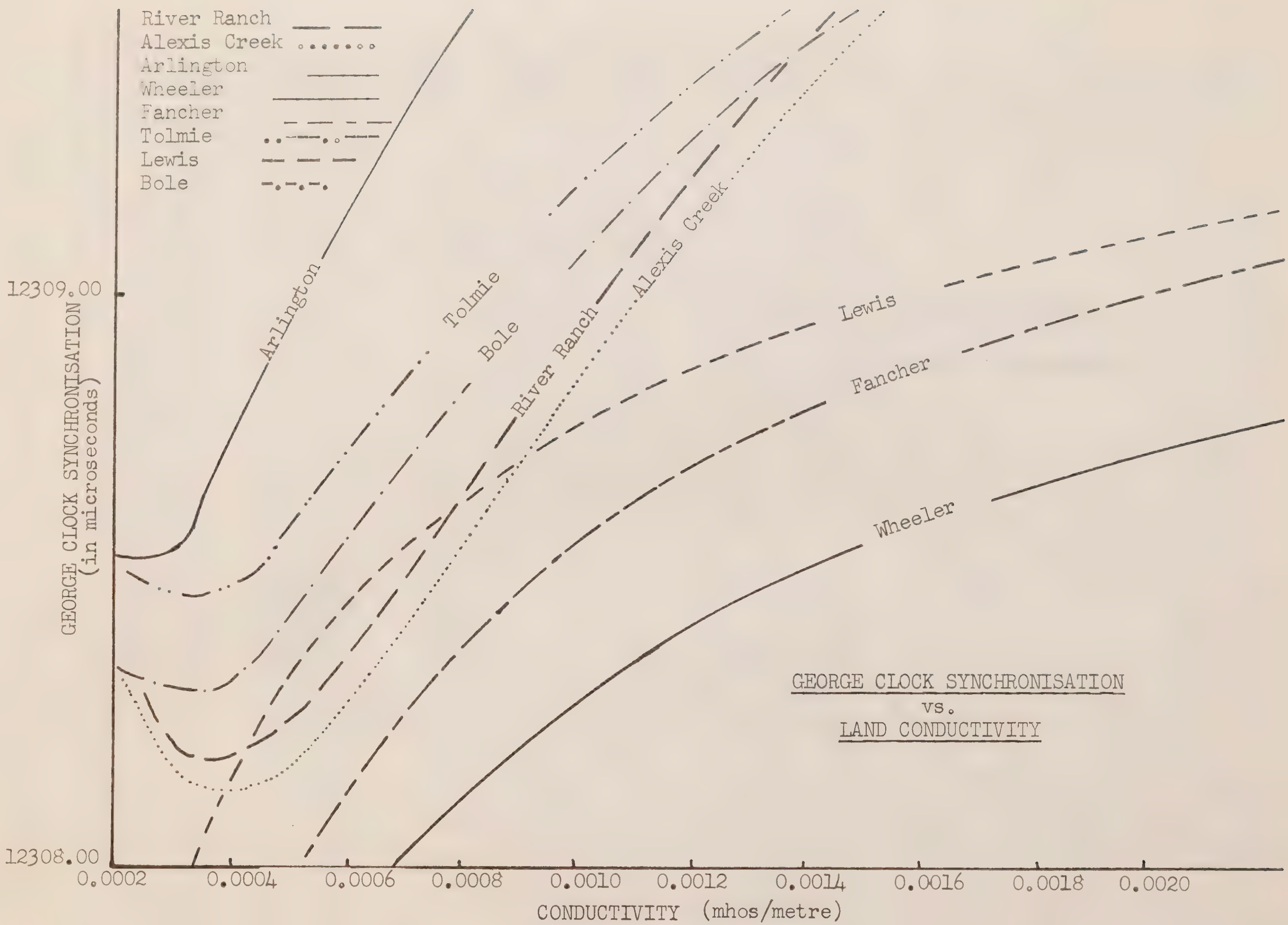

River Ranch
Alexis Creek
Arlington
Wheeler
Fancher
Tolmie
Lewis
Bole
GEORGE CLOCK SYNCHRONISATION (in microseconds)
12309.00
12308.00
0.0002
0.0004
0.0006
0.0008
0.0010
0.0012
0.0014
0.0016
0.0018
0.0020
CONDUCTIVITY (mhos/metre)
GEORGE CLOCK SYNCHRONISATION
vs.
LAND CONDUCTIVITY

Figure 16.

reciprocity of phase lag that makes Millington's Method theoretically valid over smooth terrain, the same effective conductivity should have resulted in Williams Lake to LEWIS as in George to ALEXIS/RIVER. BOLE AND ALEXIS/RIVER intersects at land conductivity of 0.0015 for which the clock synchronization for LEWIS is 0.5 microseconds low. FANCHER AND WHEELER are even lower than LEWIS by 0.2 and 0.4 microseconds and I have no logical explanation why this has occurred. The clock synchronization constants and the land conductivities near the transmitters are given in Table 22.

Table 22.

CLOCK SYNCHRONIZATION AND LAND CONDUCTIVITY

	Clock Synchronization	Land Conductivity
Master	12309.90 microseconds	0.0013 mho/m
X-Slave	12308.94	0.0010
Y-Slave	12309.43	0.0006

As a caution, these clock synchronizations are only valid during the survey. Following the survey the emission delays were changed probably three times prior to the commissioning of the chain.

The travel time for transmissions to arrive at BOLE are, therefore, the adjusted T.O.A. (for clock rate) minus the clock synchronization also minus the emission delay for Y-Slave.

Table 23.

ADJUSTMENT OF TRAVEL TIMES TO BOLE

	Master	Y-Slave
Adjusted T.O.A.	13569.30	42337.35
Clock Synchronization	-12309.90	-12308.43
Emission Delay		-28927.37
Travel Time to Bole	1259.40	1101.55

Table 24

OBSERVED TRAVEL TIMES AND A.S.F. (in microseconds)

For Clock Synchronization Data see Table 22.
Emission Delay for George, Washington is 28927.37 microseconds and for Shoal Cove is 13343.58.

	Obs. T.O.A.	Corr. T.O.A.	Calc. T.O.A.	Obs. A.S.F.	Calc. A.S.F.
At RIVER RANCH					
to Williams Lake	12413.48	103.58	102.54	1.04	1.02
to George, Washington	43180.94	1945.14	1940.01	5.13	5.20

Table 14 (Cont'd)

	Obs. T.O.A.	Corr. T.O.A.	Calc. T.O.A.	Obs. A.S.F.	Calc. A.S.F.
AT ALEXIS CREEK					
to Williams Lake	12525.74	215.84	214.42	1.42	1.45
to George, Washington	43300.99	2065.19	2060.01	5.18	5.33
AT LEWIS					
to Williams Lake	14228.27	1918.37	1914.15	4.22	4.21
to George, Washington	41346.60	110.80	109.28	1.52	1.52
AT WHEELER					
to Williams Lake	14277.52	1967.62	1963.53	4.09	4.27
to George, Washington	41408.12	172.32	170.98	1.34	1.86
AT FANCHER					
to George Washington	41435.06	199.26	197.55	1.71	2.00
AT ARLINGTON					
to Williams Lake	13716.35	1406.95	1403.83	3.12	3.60
to George, Washington	41974.39	738.59	734.32	4.27	3.55
AT BOLE (Patricia Bay)					
to Williams Lake	13569.30	1259.40	1256.58	2.82	2.82
to George, Washington	42337.35	1101.55	1098.04	3.51	3.37
AT TOLMIE					
to Williams Lake	13635.64	1325.74	1322.96	2.78	2.90
to George,Washington	42273.87	1038.07	1034.68	3.39	3.10
AT MASSETT					
to Williams Lake	14633.75	2322.00	2318.81	3.19	3.95
to Shoal Cove	26220.72	566.35	565.25	1.10	1.10
to George, Washington	45141.40	3903.75	3898.70	5.05	6.36
AT PATRICIA BAY					
to Williams Lake	-	1259.66	1256.83	2.83	2.68
to Shoal Cove	-	-	-	-	-
to George, Washington	-	1101.67	1098.17	3.50	3.46

CONCLUSIONS

1. Time of arrival measurements of Loran-C signals are more art than science.

2. If the length of lead-in cable is minimized, a whip antenna can provide adequate time of arrival measurements. In any case, excessive length of antenna lead-in cable should be avoided.

3. Two cesium standards should be used when travelling to make phase lag measurements. They should be constantly compared through a phase comparator.

4. Near field effects on T.O.A. measurements from a truck can be avoided at distances greater than 50 km from the transmitter.

5. Terrain anomalies for T.O.A. measurements in mountainous areas are unavoidable. To derive phase lags for charting it may be necessary to observe T.O.A.'s at several sites and compute an average phase lag.

6. The travel time of a Loran-C pulse from Williams Lake to Patricia Bay (BOLE) is1259.40μsec and A.S.F. is 2.82 μsec.

   The travel time from George, Washington to Patricia Bay (BOLE) is 1101.55 μsec and the A.S.F. is 3.51 μsec.

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